OFFICERS

President, FRANKLIN W. BARBER
Oakdale, Long Island, N.Y.
President-Elect, WILLIAM V. HICKEY
New York City, N.Y.
First Vice-President, JOHN J. SHEURING
Athens, Georgia
Second Vice-President,
CHARLES E. WALTON
Laramie, Wyoming
Secretary-Treasurer, VINCENT T. FOLEY
City Health Dept., Kansas City, Mo.

Executive Board

FRANKLIN W. BARBER
WILLIAM V. HICKEY
JOHN J. SHEURING
CHARLES E. WALTON
VINCENT T. FOLEY
HAROLD B. ROBINSON
PAUL CORASH

Publication Board

DR. J. C. OLSON, JR. H. L. THOMASSON
VINCENT T. FOLEY

Editors

DR. J. C. OLSON, JR., *Associate Editor,* Dept. Dairy Husbandry, University of Minn., St. Paul 1, Minn.

H. L. THOMASSON, *Executive Secretary and Managing Editor,* Box 437, Shelbyville, Indiana

Associate Editors

C. A. ABELE ..... Chicago, Illinois
H. S. ADAMS ..... Indianapolis, Indiana
M. P. BAKER ..... Ames, Iowa
F. W. BARBER .... Oakdale, Long Island, New York
F. C. BASELT .... New York, New York
L. A. BLACK ..... Cincinnati, Ohio
C. R. FELLERS ..... Amherst, Mass.
J. C. FLAKE ..... Chicago, Illinois
L. G. HARMON ..... East Lansing, Mich.
E. K. HARRIS ..... Cincinnati, Ohio
C. A. HUNTER ..... Topeka, Kansas
C. K. JOHNS .. Ottawa, Ontario, Canada
O. W. KAUFMANN .. East Lansing, Mich.
W. C. LAWTON ..... St. Paul, Minnesota
W. S. MUELLER ..... Amherst, Mass.
K. G. WECKEL ..... Madison, Wisconsin
J. C. WHITE ..... Ithaca, New York

The Journal of Milk and Food Technology (including Milk and Food Sanitation) is issued monthly beginning with the January number. Each volume comprises 12 numbers. Published by the International Association of Milk and Food Sanitarians, Inc., with executive offices of the Association, Blue Ridge Rd., P. O. Box 437, Shelbyville, Ind.

Entered as second class matter at the Post Office at Shelbyville, Ind., March 1952, under the Act of March 3, 1879.

EDITORIAL OFFICES: J. C. Olson, Jr., Associate Editor, Dept. Dairy Husbandry, University of Minn., St. Paul, Minn.; H. L. Thomasson, Managing Editor, P. O. Box 437, Shelbyville, Ind.

Manuscripts: Correspondence regarding manuscripts and other reading material should be addressed to J. C. Olson, Jr., Associate Editor, Dept. Dairy Husbandry, University of Minn., St. Paul, Minn.

"Instruction to Contributors" can be obtained from the Editor for the use of contributors of papers.

Journal of

MILK and FOOD TECHNOLOGY

INCLUDING MILK AND FOOD SANITATION AND MILK TECHNOLOGY

Official Publication

International Association of Milk and Food Sanitarians, Inc.

REG. U.S. PAT. OFF.

Vol. 22 June No. 6

Contents *Page*

Is Weigh Tank Sampling Accurate?
Alec Bradfield 163

Report of the Committee on Education and Professional Development 167

Recent and Proposed Dairy Legislation in New York State
David K. Bandler 170

Legal Aspects of 3-A Sanitary Standards
C. M. Fistere 172

Studies on the Bacteriological Quality of Frozen Meat Pies.
II. A Comparison of the Methods for the Enumeration of Coliforms
Karl Kereluk and M. F. Gunderson 176

Insecticide Residues in Milk and Milk Products.
III. Insecticide Residues in Dairy Products and Associated Problems
E. H. Marth and B. E. Ellickson 179

Special Service Article — Tuberculosis and Brucellosis as Milkborne Diseases 182

News and Events 186

Index to Advertisers VII

Business Matters: Correspondence regarding business matters, advertising, subscriptions, orders for single copies, etc., should be addressed to H. L. Thomasson (address above).

Subscription Rates: One volume per year
Individual non-members, Governmental and Commercial Organization subscription, 1 yr. $6.00
Public and Educational Libraries, 1 yr. $4.00
Single Copies $1.00

Orders for Reprints: All orders for reprints should be sent to the executive office of the Association, P. O. Box 437, Shelbyville, Ind.

Membership Dues: Membership in the **International Association of Milk and Food Sanitarians, Inc.,** is **$5.00 per year,** which includes annual subscription to the **Journal of Milk and Food Technology,** (including **Milk and Food Sanitation**). All correspondence regarding membership, remittances for dues, failure to receive copies of the Journal, changes of address, and other such matters should be addressed to the Executive Secretary of the Association, H. L. Thomasson, Box 437, Shelbyville, Indiana.

COPYRIGHT, 1959 INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC.

Objective:

TO ASSURE FULL VITAMIN POTENCY AND FLAVOR STABILITY DURING THE SHELF LIFE OF THE MILK

It is important for all those associated with the milk industry to know about the extremely high quality of Vitex® Vitamin Concentrates. There is perhaps no other industry where health and sanitation standards, where inspection, control and regulation, play such a key role. In consequence, it is well to realize that Vitex concentrates meet or exceed every criterion and are entirely acceptable as a food additive.

Vitex concentrates are processed in a Grade A plant under AAA standards. Every batch of pure vitamin crystals is assayed before processing. And not one batch of the finished product can be released for shipment until the laboratory provides a clean bill of health concerning: total plate count; thermophile count (37° and 55°C) at 10 days; viscosity; physical appearance (fat and solids separation at 10 days at 37°C); final report of vitamin assay.

Vitamin additives offer dairies a profitable means of providing better balanced nutrition. Vitex Vitamin Concentrates are the consumer's best assurance of purity, potency and stability.

VITEX LABORATORIES

A Division of NOPCO CHEMICAL COMPANY
GENERAL OFFICES: 60 Park Place, Newark, N.J.
PLANTS: Harrison, N.J. • Richmond, California

NOPCO®

Pioneer Producers of a Complete Line of Vitamin Concentrates for the Dairy Industry

FAST—SAFE AND MORE ECONOMICAL

NEW B·K® POWDER

the chlorine dairy sanitizer you can trust

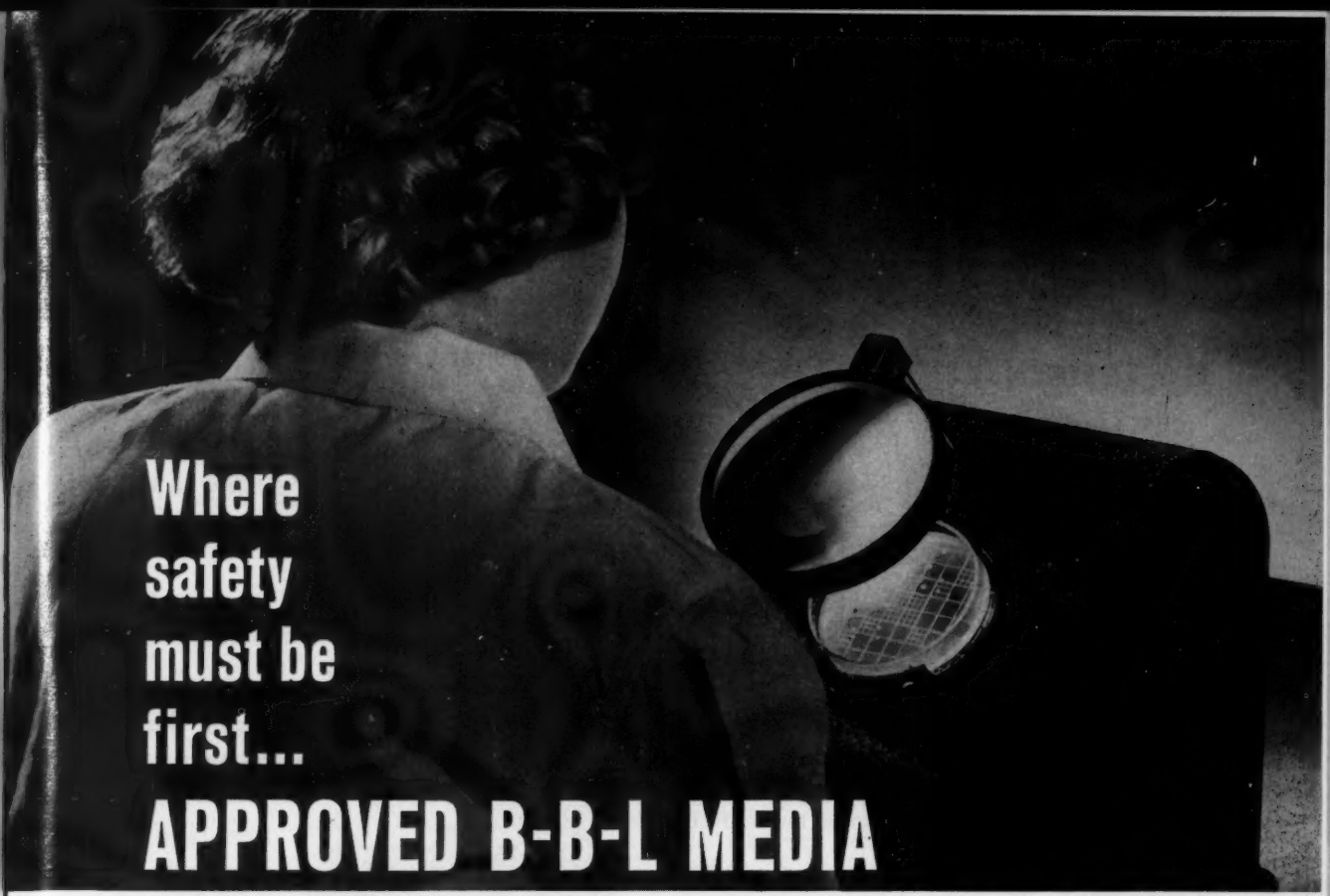
Famous for generations—now more popular than ever! More effective too—with dependable quality and performance bottle after bottle.

No costly equipment or complicated processes. Just measure, mix with water.

New B-K Chlorine-Bearing Powder—the easy, fast dairy sanitizer that helps produce milk low in bacteria count, high in quality!

Write for free booklet to B-K Dept. 872, Pennsalt Chemicals Corp., *East:* 3 Penn Center, Phila. 2, Pa. *West:* 2700 S. Eastern Ave., Los Angeles 22, Cal.

Pennsalt Chemicals
ESTABLISHED 1850



Where safety must be first...

APPROVED B-B-L MEDIA FOR THE SANITARY BACTERIOLOGIST

"standard plate count" medium... **B-B-L 01-298—MILK PROTEIN HYDROLYSATE AGAR (M-P H MEDIUM)**

• Officially replaces media used prior to 1953 for the examination of milk and dairy products.[1,2] • Officially adopted in 1953 for the examination of eggs and egg products.[3] • Standard plating medium for the examination of water since 1955.[4]

recommended media for detection and enumeration of coliforms in milk, dairy products and water...[1-4]

B-B-L 01-298—**MILK PROTEIN HYDROLYSATE AGAR (M-PH MEDIUM)**
B-B-L 01-114—**DESOXYCHOLATE LACTOSE AGAR**
B-B-L 01-186—**BRILLIANT GREEN BILE BROTH 2%**
B-B-L 01-274—**FORMATE RICINOLEATE BROTH**
B-B-L 01-286—**VIOLET RED BILE AGAR**
B-B-L 01-122—**LACTOSE BROTH**
B-B-L 01-245—**ENDO AGAR**
B-B-L 01-180—**EOSIN METHYLENE BLUE AGAR (LEVINE)**
B-B-L 01-269—**LAURYL SULFATE BROTH**
B-B-L 01-183—**TRYPTICASE GLUCOSE EXTRACT AGAR**

(1) Standard Methods for the Examination of Dairy Products, ed. 10, New York, American Public Health Association, 1953. (2) Committee Report, Am. J. Pub. Health 42:1131 (Sept.) 1952. (3) Microbiological Methods, report at 66th Ann. Meet. Assn. Official Agricultural Chemists, Sept. 29, 1952: J. Assn. Official Agr. Chem. 36:91 (Feb.) 1953. (4) Standard Methods for Examination of Water, Sewage and Industrial Wastes, ed. 10, New York, American Public Health Association, 1955.

Literature on B-B-L's complete line of culture media and apparatus for the microbiological laboratory sent on request. (#12)

B-B-L **BALTIMORE BIOLOGICAL LABORATORY, INC · BALTIMORE 18, MARYLAND**
A Division of Becton, Dickinson and Company

PHOTO COURTESY OF AMERICAN OPTICAL COMPANY, INSTRUMENT DIVISION. 6568B

B-B-L and Desoxycholate Agar are trademarks.

HEIL-DELIVERED MILK

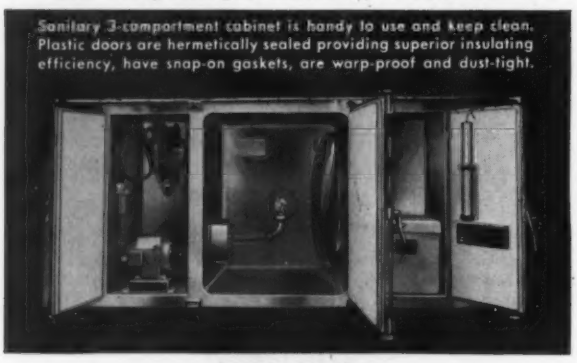
Chances are Heil helped deliver this child's milk ... because more milk is delivered in Heil tanks than all others combined.

You can count on the milk being fresh and pure. For more than 25 years, Heil has led the way in sanitary design of milk transport tanks. Heil "firsts" include —

- removable snap-on door gaskets for easier cleaning
- 3-compartment cabinet for sanitation by isolation
- FRIGID-LITE* plastic tanks, newest and most advanced design in the industry

Other improved features for better sanitation include a wall-mounted pump to simplify cleaning of compartment floor, clamp-type valve that's easy to remove for daily cleaning, and single gasket and locking device to seal the manhole and dust cover.

Heil takes pride in doing its part to help sanitarians keep milk pure all the way to the consumer.


Sanitary 3-compartment cabinet is handy to use and keep clean. Plastic doors are hermetically sealed providing superior insulating efficiency, have snap-on gaskets, are warp-proof and dust-tight.

THE HEIL CO.

3000 W. Montana St., Milwaukee 1, Wisconsin
Factories: Milwaukee, Wis., Hillside, N. J., Lancaster, Pa.

Heil products for the dairy industry include pick-up and transport tanks of stainless steel and FRIGID-LITE* plastic, cylindrical and rectangular milk storage and cooling tanks.

*Registered trademark

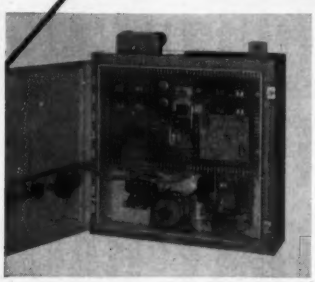
KLENZADE

KLENZMATION®

Automated Cleaning of

STORAGE TANKS AND BULK PICK-UP TANKS

Pre-Engineered "Package" AUTOMATION SYSTEMS


KLENZMATION CONTROL CENTER

Complete automation components ready for installation. Fully automatic system pre-engineered to reduce costs. Provides complete cleaning cycles with controlled detergent and water usage. Automatic time and temperature control. Also new improved Klenz-Spray units for cleaning bulk pick-up tanks and storage tanks. Only Klenzade offers this wide choice of selective components and matching systems.

KLENZMATION TANKER WASHING INSTALLATION

Most Versatile Systems Yet Devised

Write for Illustrated Literature

KLENZADE **KLENZADE PRODUCTS, INC.**

Systematized Sanitation ALL OVER THE NATION

BELOIT WISCONSIN

IS WEIGH TANK SAMPLING ACCURATE?[1]

ALEC BRADFIELD

Department of Animal and Dairy Husbandry
The University of Vermont, Burlington, Vermont

(Received for publication July 11, 1958)

A method was developed for checking weigh tank sampling accuracy that was better than comparing samples from different locations in tanks. Long, narrow, deep weigh tanks with a steep pitch in the bottom yielded the most accurate samples. Cube-shaped tanks with a hopper at one corner, and round tanks gave excellent results. High fat milk was more difficult to mix than lower fat milk. Sampling location influenced gain or loss in fat.

Reference to the literature on weigh tank sampling soon establishes the fact that there are serious inaccuracies in producers' tests caused by obtaining samples that do not accurately represent the milk in the weigh tank. Marquardt and Durham (*5*) report only 31.5 per cent of the samples accurate in one plant over a two-year period. Bailey *et al.* (*2*) found only six of 23 plants with no variations and McBride (*6*) mentions the "unsolved problems in the field of butterfat testing."

Regarding the cause of the problem, Bailey *et al.* (*2*) and Bailey (*1*) attribute it to exhaustive creaming. Osborn (*7*) believes the use of electric milk coolers by producers increases the problem of accurate sampling. Whatever the cause, plant operators continue to complain about fat losses and producers about low tests.

Much research has been done on the subjects of accuracy of the Babcock test and composite vs. daily samples. Although tests must be accurate they are of no value unless the sample represents all of the milk being tested. The weigh tank sample must be accurate. This means that milk must be completely mixed in the weigh tank before a sample is taken. The cream that has risen on milk held overnight must be mixed with the rest of the milk in the can, and the milk from different cans has to be mixed together. In most cases this is attempted without the aid of mechanical mixing. This report deals with factors influencing the adequacy of weigh-tank sampling. A more detailed report has been published in bulletin form[2].

Bailey *et al.* (*2*) found that fat tests are lowest at the dumping end of the weigh tank and highest at the outlet end. Bailey (*1*) and Osborn (*7*) found the lowest testing milk at the dumping end of the tank 90 per cent of the time. Gould and Stout (*3, 4*) and Pegram (*8*) reported they found variations of two-tenths of one per cent from samples secured in different parts of the vat. Osborn (*7*) stated "The average variation on samples taken from the front and back of the weigh vats averaged approximately three-tenths of one per cent." Tracy and Tuckey (*10*) indicated that the location of the sample opening in the weigh can cover may cause wide variation in the fat test.

PROCEDURE

The study was divided into two parts: first, to discover the cause of the problem and develop a method of checking weigh tanks for sampling accuracy; and second, to study weigh tanks of various designs under actual operating conditions and evaluate the sampling accuracy.

The first part of the work was done with a weigh tank that was guaranteed by the manufacturer to deliver accurate samples. It was 46½ inches long, 24 inches wide and had a pitch, from dump end to outlet, of 0.52 inches per foot.

All cold milk was used in one set of trials. This milk had been cooled overnight to 38°F. in a farm can cooler and was exhaustively creamed. Another set of trials involved cooled (night) milk and uncooled (morning) milk dumped together. This was varied between dumping cold milk first and warm milk first.

Attempts were made to develop an accurate method of checking weigh tanks for mixing ability. Milk was dumped into the weigh tank and a sample taken. The milk was then stirred with a hand agitator at 60 strokes per minute. Samples were taken every 15 seconds for 90 seconds, at five different locations in the tank, center and each corner. All the samples were tested for butterfat and compared.

As each can was filled at the farm the milk was thoroughly mixed and a sample taken. Samples were taken from the weigh tank when the milk was dumped the next day. All samples were tested by the Babcock method using the utmost precaution to insure accuracy.

The second part of the study consisted of checking weigh tanks in 53 plants by the method developed in Part I. Samples were not taken at the farm. Milk was sampled at the usual sampling position, stirred with

[1] Journal Series Paper Number 85 of the Vermont Agricultural Experiment Station.

[2] Vermont Agricultural Experiment Station Bulletin 603, *Factors That Influence the Accuracy of Weigh Tank Sampling.*

a hand agitator for one minute at 60 strokes per minute and another sample taken. The tests were compared and analyzed in relation to; design of weigh tank, use of agitators, sampling location and fat content of the milk. The average number of shippers studied per plant was 49, ranging from 18 to 115.

RESULTS: PART I

Trial 1

When all cold milk was used only five of the 72 samples checked with the original test of the milk. Actual variations in test ranged from 0.1 to 0.9 with an average of 0.317. The higher fat milk showed the greatest variation.

Trial 2

Uncooled morning milk was dumped first and cooled night milk dumped on top of it. Twenty-eight of the 60 samples checked with the original test, 29 had variations of 0.1 and one had a variance of 0.3. When cold, night milk was dumped first, 32 of the 69 samples checked with the original test, 35 varied 0.1, one 0.2 and one 0.4.

Examination of results of samples taken from five locations in the weigh tank showed that 63.4 per cent of the 41 lots varied more from the actual test than from each other. One lot showed exactly the same test at all locations but showed a difference of 0.7 from the actual test of the milk.

Trial 3

Cold, creamed, night milk was used in this trial. Twenty-five lots of milk were used ranging in fat test from 3.9 to 5.7 per cent. As soon as the milk was dumped a sample was taken from the usual sampling location. The milk was then stirred with a hand agitator at 60 strokes per minute for 90 seconds and a sample taken every 15 seconds. It was found that in 20 of the 25 trials a sample taken anywhere in the tank after stirring for 30 seconds yielded the same test as the original milk. The other five lots varied only 0.1. Samples taken before agitation checked with the original test in only five cases and varied from 0.1 to 0.6.

This method of testing for weigh tank accuracy was tried out in eight milk plants using different types of tanks. They varied considerably with regard to sampling accuracy when samples were taken in the regular manner. After 15 seconds of hand agitation 33 of the 44 lots yielded accurate samples, two needed 45 seconds and nine needed 30 seconds.

CONCLUSIONS: PART I

The results show that all cold, creamed milk does not mix as well in the weigh tank as a blend of cooled and uncooled milk.

There is a definite relationship between the fat content of milk and accuracy of sampling, the higher fat milk being more difficult to mix.

The test of samples taken from different locations in the weigh tank is not a good criterion of sampling accuracy or mixing ability of a tank. The variation in tests between the usual sampling location and the actual test of the milk bears very little relation to the variation in tests between several sampling locations. This is in agreement with results reported by Powers (*9*).

It was demonstrated that it is possible to check the performance of a weigh tank by agitating the milk for 15 to 45 seconds with a hand agitator and comparing the test of the sample with that obtained at the regular sampling location before agitation.

PART II. COMMERCIAL PLANT STUDIES

In this part of the study 2597 lots of milk were

TABLE 1 — RESULTS OF CHECKING PLANT WEIGH CANS FOR SAMPLING ACCURACY

Tank No.	Number of samples	Weigh tank dimensions (inches) Length	Width	Depth	Percent no variation	Percent 0.1 variation	Percent over 0.1 variation	Greatest variation	Percent of errors in favor of producer
1	55	62	22	12-24	74	26	0	0.1	43
2	48	46	19	19-22	71	23	6	0.4	86
3[a]	57	38	18	23-26	61	33	6	0.3	34
4	46	58	35	9-13	50	30	20	0.5	87
5[b]	48	58	38	10-16	50	25	25	0.6	50
6	48	50	26	8-12	48	23	29	0.7	32
7	44	50	34	8-12	41	34	25	0.5	54
8	60	48	27	9-15	38	32	30	0.6	65
9	41	42	35	12-16½	32	34	34	0.6	61
10	115	48	36	15-18	43	22	35	0.8	45
11	57	35	30	15-19	18	46	36	2.1	79
12	27	48	36	20-24	30	37	33	0.4	52
13[c]	47	48	33	9-13	53	36	11	0.3	64
14[d]	18	48	36	20	56	28	16	0.2	100

[a] Tilted plate beneath strainer in hopper to direct milk into either side of double tank.
[b] Chute under strainer directs milk to center of tank.
[c] Blender under strainer.
[d] Plate under strainer directs milk to outlet end of tank.

checked in 53 different milk plants using the method described in Part I. It was decided to hand agitate for 60 seconds to make sure that all the lots of milk were completely mixed.

In analyzing data of this kind there are two main considerations: first, the percentage of samples showing little or no variation from the actual test of the milk; and second, the magnitude of the variations that do exist. For the most part, the results in Table 1 are reported with these two things in mind. This table does not list all of the tanks studied. Examples have been selected which represent types of design that gave various results.

Influence of design of tanks.

Tank No. 1 represents the group of tanks that gave the best results, 89 to 96 per cent of the samples varying 0.1 or less and none of the variations exceeding 0.3. These tanks are long, narrow, fairly deep with considerable pitch to the bottom. The bottom is curved from the sides to the center, gradually at the dump end and more steeply at the outlet end. This allows the milk to roll under and over creating a good mixing pattern. Tank No. 2 represents a group that showed 88 to 94 per cent with 0.1 or less variation and the greatest variation was 0.4. These tanks differed from the first group in one respect only; they were shorter. Both of the first two groups had one important characteristic, the width was less than half the length. Tank No. 3 was wider in relation to its length and has less pitch than tanks 1 and 2. The good results may be attributed to the influence of the tilted plate beneath the strainer.

Tanks 4, 5, and 6 represent a group showing less accuracy. Not more than 84 per cent of the samples varied 0.1 or less and in one case only 71 per cent met this standard. Variations ran as high as 0.7. Most of the tanks had a width that was more than half the length and were quite shallow.

Tanks 7 through 12, showed poor results. The best one had only 75 percent of the samples varying 0.1 or less, the others ranging from 69 down to 31 percent. Individual variations were as high as 2.1 with only two as low as 0.4. None of them had a width less than half the length and some of them would be classed as shallow.

Number 13 shows a departure from this trend. It showed fairly good results, although the width was over half the length and it was a very shallow tank. However, it had a blender under the strainer which apparently assisted greatly in mixing the milk.

Number 14 was another type that would have been expected to show poor results. The width was two-thirds of the length and although deep had a flat bottom. The fairly good results may have been caused by the presence of a chute under the strainer which directed the milk toward the outlet end of the tank. One unusual feature of this tank was the fact that it was the only one in which 100 percent of the errors were in favor of the producer.

These results indicate that the width of weigh tanks generally should be less than half the length; average depth over 10 inches with a steep pitch in the bottom. The extra length gives the milk room to travel and create a roll, and the steep pitch causes it to go down, up and over developing a good mixing action.

Effect of sampling location.

Records were kept of the gain or loss of fat for each plant on the days that the weigh tank was checked. These were gains or losses caused by inacurate sampling only. The sampling location was in most cases the determining factor as to whether a plant had a gain or loss. Figure 1 shows the gains and losses according to sampling location. They are expressed in percentage of total fat received on the day of the tests. It is evident that except for one case the plant gained fat when the sample was taken near the dump end and lost fat when sampling was done near the outlet end. The results for the producer would, of course, be the exact opposite of this. These were all tanks that had shown poor mixing ability without agitation.

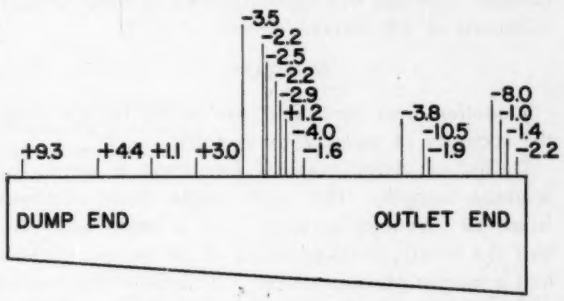


Figure 1. Percent gain or loss in butterfat as influenced by sampling location; based on 19 trials on different weigh tanks.

Mechanical Agitators

Eight tanks equipped with mechanical agitators were studied. Five gave excellent results although they were not of the type of design that gives good results without agitation. The other three gave very poor results. These three agitators were high speed with propellor blades only 2¾ inches long. This type of agitator merely bores a hole in the milk without doing much mixing.

Round Tanks

Five round weigh tanks were studied. They varied

from 15 to 19 inches in depth and all had hoppers. All gave excellent results which may have been partly caused by the use of hoppers.

Square Tanks

Two of these were studied. They actually were the shape of a cube. The outlet was in the center of the bottom. Both were equipped with hoppers. One gave excellent results and the other poor. The good one had the hopper on one corner and the poor one had the hopper in the center of one side. With the hopper on one corner it was noticed that the milk rotated rapidly in the tank setting up a good mixing pattern.

Influence of Fat Content of Milk

All samples were divided into two groups; those testing 4.0 percent or less and those testing over 4.0 percent. Fifty-four percent of the lower fat group and 46 percent of the higher fat group showed no variation. Only four of the 1073 lower fat samples had a variation over 0.5 but 48 of the 1890 higher fat samples exceeded this figure. Eleven of these 48 had variations of 1.0 percent or more.

SUMMARY

A method was developed and tested for checking the accuracy of weigh tank samples.

Design of weigh tanks is important in obtaining accurate samples. The best results were obtained from: (*a*) rectangular tanks with a width less than half the length, average depth of 10 inches or more and a steeply pitched bottom; (*b*) cube shaped tanks with a hopper on one corner and, (*c*) round, deep tanks.

Fat content of milk has some influence on sampling accuracy. Creamed milk testing over 4.0 percent fat is more difficult to mix than lower fat milk.

Agitators are of value if selected carefully. The disadvantages are that they may not be of correct design for the tank and they may be shut off or cease to operate because of mechanical failure.

Gain or loss of fat caused by inaccurate sampling was definitely influenced by the sampling location.

LITERATURE CITED

1. Bailey, D. H. Methods of sampling milk. Penn. Agr. Expt. Sta. Bull. 310. 1934.

2. Bailey, D. H., Twining, F. M., Mitten, J. W., and Swope, W. D. Weigh vat test variations. Intern. Assoc. Milk Dealers, 25th Convention Proceedings, Lab. Sect., pp. 157-170. 1932.

3. Gould, I. A., and Stout, R. E. Fat variation in milk. Milk Plant Monthly **38** (2):32-35. 1949.

4. Gould, I. A., and Stout, R. E. Fat variation in milk. Milk Plant Monthly **38** (3):36-40. 1949.

5. Marquardt, J. C., and Durham, H. L. Sampling milk for fat test at milk plants. N. Y. Agr. Expt. Sta. (Geneva) Bull. 605. 1932.

6. McBride, C. G. Midwestern Milk Marketing Conference Proceedings, p. 59. Illinois Univ. Extension. 1947.

7. Osborn, F. H. Midwestern Milk Marketing Conference Proceedings, pp. 7-8. Illinois Univ. Extension. 1947.

8. Pegram, C. W. Midwestern Milk Marketing Conference Proceedings, p. 9. Illinois Univ. Extension. 1947.

9. Powers, A. J. Accuracy of sampling for fat tests at the weigh can. Laboratory Methods Comm. Rept., Intern. Assoc. Milk Dealers, 25th Convention Proceedings, Lab. Sect., pp. 150-157. 1932.

10. Tracy, P. H., and Tuckey, S. L. Accuracy of methods of sampling milk deliveries at milk plants. Illinois Agr. Expt. Sta. Bull. 459, pp. 47-84. 1939.

REPORT OF THE COMMITTEE ON EDUCATION AND PROFESSIONAL DEVELOPMENT

The Committee on Education and Professional Development accomplished its objectives through the use of subcommittees.

The Subcommittee on Scholarships reports the following:

A resolution was adopted at the annual meeting at Louisville, Kentucky, whereby the Association Scholarship shall be known as the "William B. Palmer Scholarship." The scholarship announcements and application forms were changed to comply with the resolution.

The closing date of the receipt of the applications at the Shelbyville, Indiana address has been changed from July 1 to June 15. The July 1 date did not permit sufficient time to review the applications satisfactorily.

To clarify the application form a few changes were made at the time of the reprinting.

The announcement and application forms were sent to the following:

University of Denver
Denver, Colorado
Florida State University
Tallahassee, Florida
University of Florida
Gainesville, Florida
Utah State Agriculture College
Logan, Utah
San Jose College
San Jose, California
Southern Illinois University
Carbondale, Illinois
University of Oklahoma
Norman, Oklahoma
Indiana University
Bloomington, Indiana
University of Michigan
Ann Harbor, Michigan
State College of Washington
Pullman, Washington
Tulane University of Louisiana
New Orleans, Louisiana
Rutgers University
New Brunswick, New Jersey
University of North Carolina
Chapel Hill, North Carolina
University of Massachusetts
Amherst, Massachusetts
University of Washington
Seattle, Washington
University of California
Los Angeles, California

Four applications were received for the "William B. Palmer Scholarship". Two of the applicants were not eligible. One, because his major course of study was in Dairy Science, and the other was received after the closing date and his major course of study was in Agriculture.

From the two eligible candidates a recommendation will be made to the Executive Boards of the IAMFS.

The monies contributed to date to the scholarship fund by the affiliates is as follows:

12- 5-56	Tennessee	$15.00
4- 2-56	Florida	25.00
6-20-56	Indiana	45.00
7-13-56	Kentucky	8.75
12-10-56	South Dakota	8.00
2- 2-57	Illinois	25.00
4-18-57	Georgia	21.75
9-23-57	Wisconsin	67.00
1-29-58	Illinois	35.00
2- 5-58	South Dakota	7.25
4-11-58	Virginia	25.00
7-11-58	Florida	50.00
	TOTAL	$334.00

It is indeed gratifying to report that this sum has exceeded $300.00. It must be decided by the Executive Board whether or not two scholarships are to be offered next year or whether this accumulated fund shall be used for the scholarship for the 1959-1960 school year. Unless more applications are received, an additional scholarship should not be offered. A survey needs to be made to determine the number of juniors and seniors enrolled in the various colleges and universities offering a degree in Sanitary Science and/or Public Health. It may be that the numbers are small and that we cannot expect any more applications than we are receiving.

Members of the Sub-committee are : W. Howard Brown, Elmer E. Ninman and Haynes Wright.

The Subcommittee on curricula made a comprehensive study of curricula offered for the training of sanitarians and have prepared a suggested four year curriculum for sanitarians with descriptions of the courses which should be offered as follows:

FRESHMAN YEAR

Fall Semester	*Credit*
General Biology	4
General Chemistry	4
English Composition	3
Mathematics	3
Social Science	3
Total	17

Spring Semester	
General Biology	4
General Chemistry	4
English Composition	3
Mathematics	3
Social Science	3
Total	17

SOPHOMORE YEAR

Fall Semester	*Credit*
Introduction to Sociology	3
General Physics	4
Quantitative Chemistry	5
General Botany	3
Public Speaking	3
Total	18

Spring Semester	
Introduction to Sociology	3
General Physics	4
Qualitative Chemistry	4
Report Writing	3
Engineering Drawing	3
Total	17

JUNIOR YEAR

Fall Semester	*Credit*
Organic Chemistry	4
General Bacteriology	4
Psychology	3
Political Science	3
Principles of Public Health	3
Humanities	3
Total	20

Spring Semester	
Psychology	3
Political Science	3
Principles of Public Health	3

Humanities	3
Elective	6
Total	18

Suggested Electives

Epidemiology	3
Communicable Disease Control	3
Pathogenic Bacteriology	3
Parasitology	3
Medical Entomology	3

SENIOR YEAR

Fall Semester	*Credit*
History	3
Environmental Sanitation	3
Public Health Laws	3
Electives	9
Total	18

Spring Semester	
History	3
Environmental Sanitation	3
Electives	12
Total	18

Suggested Electives

Dairy Bacteriology	3
Food Bacteriology	3
Water and Sewage Bacteriology	3
Biochemistry	6
Public Health Education	3
Public Health Statistics	3
Public Health Administration	3
Public Health Problems	3
Public Health Field Experience	3

DEFINITIONS OF TERMS AND DESCRIPTIONS COURSES OF STUDY LISTED ABOVE ARE:

A *semester* is defined as a 15-week period.

A *credit* is defined as a 50-minute lecture or 3 hours of laboratory instruction.

General Biology — an introduction to the basic principles of biology with emphasis upon their importance to man and civilization.

General Chemistry — a study of fundamental principles and of typical inorganic elements and their important compounds. Solution of problems.

English Composition — a study of the fundamental principles of English composition, reading and writing.

Mathematics — a study of mathematics including college algebra, trigonometry and elements of calculus.

Social Science — Refers to studies of economics, geography, history, political science, psychology, and sociology.

Introduction to Sociology — a study of the origin and evolution of society, or of the forms, institutions, and functions of human groups.

General Physics — a general course covering the basic physical phenomena. The first semester treating Mechanics, Heat and Sound. The second semester treating Electricity, Magnetism, Light and Modern Physics.

Quantitative Chemistry — a course in quantitative analysis designed to give the student an insight into the theoretical aspects of the subject and to develop laboratory technique.

General Botany — a general survey dealing with the structure and physiology of plants.

Public Speaking — the mechanics of speech, tone formation, preparation and delivery of speeches; speech outlines and elements of speech composition.

Qualitative Chemistry — a study of the characteristics of cations and anions by which they may be detected and separated. Also, including the study of the development and application of theories of analytical importance.

Report Writing — a course designed to teach the student how to use the library, review the literature and prepare an authentic report in a short and concise manner on a given topic.

Engineering Drawing — a course in free hand lettering, proper use of equipment and materials, applied geometry, theory and application of principal methods of projection; free hand sketching; section and auxiliary views; dimensioning and simple detail drawings in accordance with American Standards Association; and in duplicating processes.

Organic Chemistry — an elementary, an introductory study of the main classes of organic compounds.

General Bacteriology — an introductory course covering the general principles and techniques of bacteriology and the relations of these organisms to sanitation, medicine, agriculture and industry.

Psychology — an elementary course which would be a survey of the main facts, principles, and laws of human behavior.

Political Science — a comprehensive analysis of American political institutions. Issues and problems faced by federal, state and local governments. Special attention paid to the leading political, economic, and social influences affecting free government.

Principles of Public Health — an introduction to the theory and application of public health principles.

Humanities — refers to courses in philosophy, logic, ethics, music, art and literature.

Elective — refers to any course of study approved by the student's advisor.

Epidemiology — a study of the principles, theories and applications of epidemiology.

Communicable Disease Control — the epidemiology and community control of communicable diseases.

Pathogenic Bacteriology—a course covering the relationship of microorganisms to disease; modes of infection; and the etiologic agents of the important infectious diseases.

Parasitology — a study of the human and other parasites.

Medical Entomology — a study of insects and other arthropods in relation to human and animal annoyance and diseases.

History — a study of American history.

Environmental Sanitation — a survey course including milk, food establishments, bakeries, restaurants and soft drink sanitation; rodent control, air polution, industrial hygiene, water supplies, and sewage disposal.

Public Health Law—a course designed to teach how to prepare ordinances, to have ordinances, regulations and laws adopted — also how to locate, read, interpret, enforce laws, and the organization of federal, state and local health departments, recent trends and developments in public health laws and regulations.

Dairy Bacteriology — bacteria and their relation to various changes that take place in milk and milk products; application of bacteriology to the quality and safety of milk and to control public milk supplies.

Food Bacteriology — the bacteriology of the preparation, preservation, and spoilage of foods, and the problem of food poisoning.

Water and Sewage Bacteriology — the bacteriology of water and sewage with special emphasis in the field of sanitation.

Biochemistry — a study of the fundamental chemistry of carbohydrates, fats, proteins, vitamins, and minerals.

Public Health Education — theory and field problems in community health education. Evaluation of objectives, methods and resource materials.

Public Health Statistics — an applied course in public health statistics designed primarily for students not majoring in biostatistics.

Public Health Administration — the administrative aspects of sanitary science as applied to the fields of communicable disease control, schools, recreation, housing emergencies, and including organizations, laws and personnel.

Public Health Problems — a discussion course on current public health problems related to environmental sanitation.

Public Health Field Experience — a course designed to give a student actual and practical experience in sanitation work under proper guidance.

The Subcommittee on Professional Standards has made a special study and report which is presented below.

John J. Sheuring, *Chairman*, Ga. Assoc.
W. Howard Brown, Co-Chairman, Fla. Assoc.
Russell B. Cunningham, Indiana Assoc.
Bernard Hartman, Missouri Assoc.
Karl Jones, Indiana Assoc.
Samuel Lear, New Jersey
Thomas Laughlin, Wisconsin Assoc.
Elmer Ninman, Oklahoma
Guy Stephens, Rocky Mountain Assoc.
Raymond Summerlin, Iowa Assoc.
Haynes Wright, Virginia

SPECIAL REPORT OF THE SUBCOMMITTEE ON PROFESSIONAL STANDARDS OF THE COMMITTEE ON EDUCATION AND PROFESSIONAL DEVELOPMENT

The need for action to help sanitarians gain professional status and registration was expressed by this Committee at the annual meeting in 1956. The increased efforts by sanitarians to secure legislation in many states to provide legal methods for registration is indicative of the interest to upgrade the professional status of qualified people in the fields of sanitation

Sanitarians must become united in their objectives and goals if they want to gain national recognition and professional status. The Subcommittee on Professional Standards believes that the International Association of Milk and Food Sanitarians should take the leadership in helping sanitarians gain progessional recognition and registration. The Subcommittee makes the following recommendations for approval at this meeting:

1. That official approval be given to the Executive Board to proceed in requesting the Sanitarian's Joint Council to:

a. Establish: "The Sanitarian's Joint Council's Registry of Professional Sanitarians"

b. Establish: "The Sanitarian's Joint Council's Registry Board"

c. Authorize: A system of fees for registration and re-registration.

d. Authorize: Expenses and compensation for members of the Registry Board.

e. Provide: Minimum standards for the registration of professional sanitarians.

The Subcommittee offers the following recommendations to guide the Council in its decisions:

1. Membership of the Registry:

(a) All registered sanitarians, under state registration laws, as of December 31, 1963 will be eligible for membership upon proper application, payment of fees and approval of the Board.

(b) All sanitarians who meet the minimum requirements of the Act for the Registration of Professional Sanitarians, recommended by the Sanitarian's Joint Council, shall be eligible for membership upon proper application, payment of fees and approval of the Registry Board.

(c) All sanitarians who have been engaged in the fields of industrial, general, environmental, food, and/or milk sanitation for a period of five years prior to December 31, 1963 will be eligible for membership upon proper application, payment of fees and approval of the Registry Board.

(d) Membership shall be permanent, upon reapplication, unless disapproved because of moral, criminal, or equivalent reasons.

2. Registry Board:

(a) The Registry Board shall consist of at least the following members:

1. Two members of the IAMFS
2. Two members of NAS
3. Two members of APHA
4. One member at large, appointed by the President of the council.

(b) Members of the Board shall be appointed by the Presidents of the sponsoring organizations, except the Member at Large.

(c) Powers of the Registry Board shall include the following:

1. Approve or disapprove applications for registration, and
2. Provide minimum registration standards.

(d) All decisions of the Registry Board shall be subordinate to the Sanitarian's Joint Council which will have final authority in cases of dispute.

3. Fees:

All fees shall be established by the Sanitarian's Joint Council but shall not exceed $10.00 for initial registration and $2.00 for re-registration.

4. Expenses of the Registry Board: Expenses shall include normal travel expenses and compensation for Board members not exceeding $25.00 per day.

The Subcommittee further recommends that the Joint Council approve the IAMFS as the administrative agent for administering the registration program, the details of which to be finalized in conference with the Executive Board of the IAMFS.

The Subcommittee further recommends that the Official Registry of Professional Sanitarians be published annually in the December issue of the Journal of Milk and Food Technology.

The Subcommittee further recommends that if the Sanitarian's Joint Council is not interested in this or a similar program, that the Executive Board of the IAMFS be given authority to proceed to establish similar criteria for the registration of sanitarians within its own structural organization.

We recommend approval of this program with final modifications as recommended by the Executive Board.

Subcommittee on Professional Standards
of the Committee on Education and
Professional Development.

RECENT AND PROPOSED DAIRY LEGISLATION IN NEW YORK STATE[1]

DAVID K. BANDLER[2]

New York State Joint Legislative Committee

on Imitation Food Products, Ithaca, New York

Dairy leaders of New York State, following the passage of the yellow oleo law, realized that reliance solely on prohibitive and restrictive legislation was not going to solve the problem of butterfat substitutes nor limit the competition from margarine. They therefore asked the Legislature to create a committee to study problems arising from this new law.

The 1952 Legislature created by concurrent resolution, the Joint Legislative Committee on Imitation Milk Products and Problems. This Committee, under the chairmanship of Assemblyman Willard C. Drumm, was established "to study the problems involved in the manufacture, sale or exposure or offer for sale of any and all food products which are in imitation of, semblance of, or as a substitute for products made from or whose principal ingredients are milk products". As the work of the Committee was continued during each of the last six years by the Legislature, this initial responsibility has received continuing study and analysis.

In 1954, at the request of dairy organizations in the State the Committee was given the further responsibility to study existing dairy laws looking toward improvements to expand outlets for dairy products produced and manufactured within the State. The following year came the authorization to study "all phases of milk production and distribution".

Under these powers the Joint Committee proposed and was successful in seeing passed the following legislation.

1. Permit the sale of modified skim milk.
2. Permit the sale of half and half.
3. Established standards for Italian cheese.
4. Defined and established standards for instant whipped cream and vegetable toppings.
5. Defined and established standards for milk shakes.
6. Established standards for diabetic ice cream.
7. Established standards for Vitamin D milk.

The 1956 session of the legislature broadened the powers and duties of the Committee to a point where it now has jurisdiction over the "production, manufacture and distribution of all foods, both real and synthetic, any ingredients added thereto . . . and the distribution and sale of proprietary drug remedies and medicines. At this time, to coincide with its powers, the name was changed to Joint Legislative Committee on Imitation Foods.

OBJECTIVES

The Committee's recommendations to all segments of the dairy and food industry are based on the following objectives as outlined in its report to the Legislature last session.

1. Assist dairy farmers in their efforts to meet competition from imitation and substitute products.
2. Encourage greater fluid milk sales through all possible outlets.
3. Provide consumers in New York State an opportunity to buy the fullest possible variety of milk and dairy products.
4. Aid consumers to get full value for each dollar spent on dairy products.
5. Foster effective competition and efficiency in the distribution of milk.
6. Protect consumers from harmful chemical additives in food.
7. Require that substitutes stand on their own merits.

These objectives are all directed toward finding every means possible to expand markets for fluid milk, dairy products and other foods and at the same time see that the best interests of the consuming public are met.

The Committee can accomplish its work through two means. The first and most important, by proposing legislation for approval by the Senate and Assembly of the State. The second, through non-legislative recommendations to state and local regulatory bodies to effect some improvement in the handling of foods.

Two projects of the committee that are of timely interest are presented below.

Late last Fall a Committee from the New York State Association Milk Sanitarians composed of Larry Clough, Frank Kosikowski and Paul Corash, contacted this Committee with a proposal to cause milk that is rejected at dairy plant deck inspections to be colored or otherwise denatured. After

---

[1]Presented at the 45th Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., in New York, September 8-10, 1958.

[2]Research Director, N. Y. State Joint Legislative Committee on Imitation Food Products, 50 Warren Hall, Cornell University, Ithaca, N. Y.

studying the problem carefully and comparing notes with other states a proposal was submitted to the legislature for study purposes.

Research into the matter indicated that at least 13 states are now practicing some form of "marking" rejected milk. On the basis of this study a bill was prepared which provided for the addition of a harmless dye to "adulterated, unclean, impure, unhealthy or unwholesome" milk or cream and the affixing of a condemnation tag to containers of such milk or cream. Unfortunately the bill was held up in Committee due to lack of support. It is Chairman Drumm's expectation that at this session the New York State Association of Milk Sanitarians will create some support for this measure.

Bulk milk

A large portion of the Committee's efforts during the Spring and Fall of 1957 were spent in determining the effect of every-other-day pick-up on bulk farm tank milk. This was a joint undertaking with the Dairy Department at Cornell. A report based upon this study was prepared for the New York City Department of Health and presumably led to a favorable decision covering every-other-day pick-up. In general there was no significant difference between the milk which was picked up either daily or every-other-day.

New York City was the last major marketing area in the state to accept every-other-day pick-up. The committee sees great savings through this method of assembling milk both for producers and for plant operators. The producer gains a 50 per cent saving in both time and materials in the washing of his tank. The smaller producer with the volume of two days' supply can justify the expense of a farm tank. The dealer or hauler should be able to realize a reduction in transportation costs and therefore can afford the payment of modest premiums. There is also a reduction in the marketing margin which eventually may be passed on to the consumer.

The Joint Legislative Committee is pleased that the New York City Department of Health has accepted its findings and applauds the action that the Department has taken.

1959 LEGISLATIVE PROGRAM

The 1959 Legislative program recently adopted by the Committee holds many promising and productive changes to our milk marketing regulations. Along with our bill to require the coloring of rejected milk, the Committee hopes to introduce legislation to permit the standardization of milk in New York State. A sub-committee to study the problem has been appointed and is under the chairmanship of Dean W. I. Myers of the New York State College of Agriculture. This sub-committee is due to report in the early fall with its recommendations and it is hoped that a bill will be available for discussion at our October hearing.

Other matters up for consideration are: the consummer grade labeling of butter, interchangeable names for sour cream (salad cream, cultured cream), a measure to control the use of chemical additives in foods and a bill to legalize ice milk in the state.

Under study at Cornell in cooperation with the Department of Dairy Industry is a whipping cream product of vital interest to the state's dairy economy. We are tentatively calling it "Stabilized Whipped Cream". It contains 18% butterfat and achieves its superior whipping properties through the use of a stabilizer in the concentration of between one and two per cent. Should research findings continue favorable with "Stabilized Whipped Cream", the dairy industry will have a moderate cost product to compete with the pressurized toppings.

Ultra high temperature, vacuum pasteurizers have drawn the attention of the Committee members. Preliminary data from out of state sources indicates that milk processed through this system has the advantages of being free from most objectionable barny and feedy flavors and has a greatly prolonged shelf life. A pilot operation has been installed in the Dairy Building at Cornell and its performance will be closely watched and reported.

The full report of the Committee will be available in a short time. Copies may be obtained from the Committee at 50 Warren Hall, Cornell University, Ithaca, New York.

Assemblyman Drumm particularly wanted me to commend your Association on the tremendous contributions that the Sanitarians are making to the State and the nation and to thank you all for your splendid cooperation with the Joint Legislative Committee on Imitation Food Products and Problems.

LEGAL ASPECTS OF 3-A SANITARY STANDARDS [1]

C. M. FISTERE

General Counsel for The Dairy Industry Committee
Continental Building, Washington, D. C.

The words "Legal Aspects" in the title of this paper are used in the general sense that the field of standardization involves considerations and problems of law. The words are not intended to mean that I shall talk about "legal aspects" only in the sense of those activities that are permitted by law and shall exclude any reference to "illegal aspects" in the sense of those that are prohibited.

However, even if the latter construction were the intended one, it would be not too inappropriate a subject, since I am sure we shall all agree that "legal" aspects are the only kind that have been engaged in, or ever considered, in connection with the 3-A Sanitary Standards at least, and that "illegal" aspects involve only things that this group and all who use the 3-A symbol will studiously avoid.

Indeed, I think this would be true of standards programs in general, and the truth of the matter is that no federal court (and there are more than a hundred of them) has ever said that standardization as such is unlawful. Why, then, we may ask, are we concerned with problems of law, and how are we reminded that these problems exist and must be kept in mind?

The first and most compelling answer is the existence of that deeply-ingrained American institution, the antitrust suit. We are never permitted to forget this unique regulatory device. Only a few days ago it was announced that the Department of Justice is gathering information concerning General Motors for presentation to a grand jury in New York, and even more recently, it has been announced that information concerning the steel industry, particularly steel businesses on the West Coast, will shortly be presented to a grand jury in San Francisco. The Department of Justice evidently feels that what is good for General Motors is not necessarily good for the United States!

These proceedings are said to involve "bigness" and undue concentration, and may not involve standardization in any way, but they serve to illustrate the need for even the most completely law-abiding organizations to be ever aware of possible pitfalls. I shall treat of this matter later on.

This paper will discuss the legal aspects of three general areas of activity of the 3-A Sanitary Standards program:

(a) Legal aspects of the formulation of sanitary standards;
(b) Legal aspects of the adoption of such sanitary standards by states and municipalities; and
(c) Legal aspects of the use of the 3-A symbol.

As basic to all of these, I should like to state the twin goals or objectives of this important 3-A program.

Broadly speaking, in the formulation of sanitary standards for dairy equipment, the first object is to specify, by definite terms, those requirements for designing, construction and finishing of contact surfaces of dairy equipment that are necessary for its sanitary performance. The word "requirements" as here used means only physical and scientific requirements, not requirements of law, since the entire program is, and of necessity must be, of a voluntary character. Not until a 3-A Sanitary Standard has been adopted by a State or municipal legislative body, do the terms of a sanitary standard become legal requirements.

The second goal or object of the 3-A program is to effect a decrease in the multitude of city, county, and state regulations governing or purporting to govern the sanitary design of dairy equipment. In this connection, it will not be necessary though it would be quite possible, to recite quite a list of local requirements which, in our view, are unnecessary for the protection of the public health and may be regarded as arbitrary and capricious. I shall leave this problem simply by recalling what was said by John Marshall, Executive Vice President of the National Association of Dairy Equipment Manufacturers, in testifying with reference to Congressman Johnson's National Milk Sanitation bill at a hearing during the 85th Congress.
Said Mr. Marshall:

> "The multiplicity of sanitary regulations applicable to dairy equipment is a problem of long standing, but considerable progress has been made, especially during the past 15 years, in reducing the problem."

Mr. Marshall went on to say that the 3-A program had played a large part in attaining uniformity, but that much still needs to be done.

In any consideration of a standardization program, the legal implications flow in general from that body of statutes known, in the composite, as the antitrust laws. As pointed out above, a standardization program

[1] Presented for the author by B. G. Haliberton at the 12th Annual Meeting of the Dairy Products Improvement Institute, Inc., at New York, N. Y. February 19, 1959.

as such has never been held to violate these or other laws. Indeed, particular standardization programs have been extolled in certain reported cases. Thus, in the Tag Manufacturers Institute case, a proceeding to review an order of the Federal Trade Commission, the United States Court of Appeals for the First Circuit says: "These standardizations are deemed to be to the advantage of all concerned, including the consumer, who, among other benefits, is thereby better enabled to know what he is buying and to make intelligent price comparisons."[2] And the Supreme Court itself spoke felicitously of the advantages accruing to both industry and the consumer from certain standardizations effected by the Maple Flooring Association 25 years earlier.[3]

However, just as every lawful instrumentality, as for example an automobile, can be put to illegal purposes, so every lawful program and organization, even a standardization program and organization, can likewise be used for unworthy and unlawful ends, and when this is done, trouble, serious trouble, will almost certainly result.

In the 3-A sanitary standards program for dairy equipment, we believe that we have a program which is valuable to the consuming public, to the fabricators of the equipment, and to the users of the equipment, and which in no way transgresses the antitrust laws. Perhaps, I interject facetiously, it is a favorable omen that the basic antitrust law, the Sherman Act, doesn't relate to 3-A's at all but to 3-C's – contracts, combinations, and conspiracies, provided, of course, that they are in restraint of trade.

Seriously, we believe the 3-A program has, from the outset, been obedient to both the letter and the spirit of this important legislation. We believe it is today. The lessons of the past are instructive as to how it may continue to be in the future.

The first of the three general areas for our consideration is that of the very formulation of the sanitary standards themselves.

It may be said flatly that this must be a strictly fish bowl operation. It must all be out in the open. There must be nothing up either sleeve, and no mirrors may be used. There must be no requirement of wearing the old school tie or of belonging to the club. And I might say that I am reliably informed that the program formulation is carried out in just such fashion.

At every step in the formulation of sanitary standards, the most zealous care is exercised to insure universal participation of interested parties. I probably need not say that the particular purpose which I have in mind as being served by such participation is not the improvement of the standards, though that commendable purpose also is doubtless served. The purpose which I have in mind is that of minimizing the possibility of actionable injury to others.

In the first place, there must of course be opportunity for participation by all members of the group or groups directly and immediately involved – sanitarians, users and fabricators of the equipment. And all of these, large or small, ought to and do have a voice in the adoption of the standards. All competitors are sought who are not members of the group so that they have an opportunity to be heard and to participate in the formulation of the sanitary standards, and as a matter of practice this is observed. But over and beyond this, there may be circumstances in which manufacturers and fabricators and users of other types of equipment that might be affected by the adoption of the sanitary standards ought to be consulted. This would probably constitute the maximum safeguard that unlawful injuries would not result from the adoption of the sanitary standards. Illustrative of this is the fact that manufacturers of factory type and direct serve ice cream freezers sat down together when consideration has been given to factory-type freezers.

Of the several kinds of illegal restraints of trade with which a contract, combination, or conspiracy might be charged, the one to be most guarded against in the formulation of sanitary standards is that of excluding competitors and other third parties from access to a market. It does not require too much imagination to see how such sanitary standards could be formulated as might very easily have this effect. The formulation and adoption of a sanitary standard which employs a process that depends upon a patent, or which requires the utilization of technical information, to which other manufacturers or fabricators do not have equal access might have the effect of excluding them from a market. So also might the formulation and adoption of a sanitary standard which requires a complete retooling or other outlays beyond the means of the smaller and less affluent members of the industry. The courts very consistently have held to be unconstitutional ordinances whose countenances have borne the pleasing appearance of public health measures, but which in fact have been found to be unattractive trade barriers. The provision of the Madison, Wisconsin, milk ordinance requiring pasteurization within 5 miles of the city is a good example of the type of illegal restraint which the courts will condemn. The organization which developes 3-A sanitary standards, consisting as it does of the multiple parties of interest, is a strong safeguard against economic or

---

[2] *Tag Manufacturers Institute, et al.* vs. *Federal Trade Commission*, 174 F. 2d, 452 (1949).

[3] *Maple Flooring Association* vs. *United States*, 268 U.S. 563 (1925).

competitive trade barrier creeping into 3-A sanitary standards.

I proceed now to a consideration of the legal aspects of the adoption of 3-A sanitary standards by states and municipalities.

Sanitation is a subject of universal and unanimous interest to state and municipal authorities. And this interest is especially keen, and especially valid, as applied to the sanitary performance of equipment used to manufacture and process such essential food items as dairy products.

It thus has transpired that states and municipalities have had a greater interest in sanitary standards than in most other kinds of standards; and have enacted a greater volume of regulations and ordinances establishing sanitary standards than other kinds of standards.

The legislative processes by which this is done are not our concern today. We are concerned with a problem of the form and content of such regulations and ordinances.

Obviously, the simplest method which would completely assure absolute acceptance of 3-A sanitary standards by state and municipal authorities would be the enactment of regulations and ordinances saying, in effect: "No dairy plant equipment may be installed or used for handling or processing milk unless the same bear a 3-A symbol." However, assume that a municipality has adopted such an ordinance, and assume that an equipment manufacturer has designed and fabricated a piece of equipment which is in fact entirely sanitary in its performance but which in one particular or another fails to conform with the 3-A sanitary standard. The manufacturer has a customer—a milk dealer—in this municipality, who wishes to buy this equipment, but the customer must advise the manufacturer that he is unable to do so since the equipment does not bear the 3-A symbol.

Or, assume that an equipment manufacturer designs and fabricates a piece of equipment which completely conforms with the specifications of a 3-A sanitary standard. However, because he wishes to avoid the expense and trouble of qualifying for use of the symbol, or because he is an individualist, or for some other reason, he fails to apply to the 3-A Symbol Council for the use of the symbol. Again, he is met with the statement from his customer, "I would like to deal with you, but I can't install your equipment because it doesn't carry the 3-A symbol."

The equipment manufacturer thereupon brings suit against the 3-A Symbol Council alleging that it is unlawfully restraining trade and commerce. He will of course ask not simple damages but treble damages, for which the antitrust laws make specific provision. It is quite possible he could establish that he has been deprived of a market and that his suit would prevail.

As compared with ordinances of the foregoing types, suppose that the ordinance in question says, in effect, that equipment which does not *comply* with the terms of 3-A sanitary standards shall not be installed or used, or that equipment which does comply, may be. Or suppose the ordinance provides that equipment may be used if its sanitary performance equals that of equipment manufactured to 3-A sanitary standards. Each of those ordinances would probably be unobjectionable.

Possibly better than any of these formulations, from the viewpoint of law, is the ordinance or regulation which adopts 3-A sanitary standards by tracking their exact language, though this involves a degree of formality which might reasonably be expected only in the cases of states and larger communities. Among other possible objections that this type of enactment eliminates is the possible unavailability to all concerned of the sanitary standards themselves. You will remember what is alleged to have been said in the *Schechter Poultry Corporation case*, in which the Supreme Court struck down the National Recovery Act—that the only known copy of the New York City Poultry code reposed in the hip pocket of the investigator who had prepared the case against Schechter. Though such a charge can be levelled at only a small minority of Health authorities today, it is true that manufacturers of equipment are sometimes in the dark about what is required of them in a particular case.

We turn now to the legal aspect of the use of the 3-A symbol. In so far concerns the use of the symbol unaccompanied by any other activities, it is far more likely that such use might run afoul of the Federal Trade Commission Act than of the antitrust laws. This Act, as you may know, declares that "unfair methods of competition in commerce, and unfair or deceptive acts or practices in commerce" are unlawful, and empowers and directs the Federal Trade Commission to "prevent" the same. The Act provides that when the Commission shall have reason to believe that such methods or acts are being engaged in, it shall bring an administrative proceeding in which the person or firm charged therewith shall appear and show cause why a cease and desist order should not be entered by the Commission. If such an order is entered, a judical review may be obtained by petition to a United States Court of Appeals.

The Act does not define "unfair methods of competition" or "unfair or deceptive acts or practices", but leaves this to the Commission for determination. And it is important to note that unfair competition or unfair or deceptive acts or practices is all that the Com-

mission must find. It is under no burden to establish the restraint of trade that must be proved by the Department of Justice in an equity or criminal proceeding and by a private litigant in a suit for damages.

The particular use of the 3-A symbol that would appear most susceptible of proscription as an unfair method of competition or as an unfair or deceptive act or practice would be its use in advertising. The possibilities here are limited only by the limits of human ingenuity and might range across the entire spectrum of misrepresentation by outright untruth, omission, inuendo or distorted emphasis. Somewhat more specifically, it would include any possible question of the right of the advertiser to use the symbol at all, statements as to the meaning of the symbol, statements as to the quality of equipment on which the symbol is used, statements as to the relative virtues of equipment on which the symbol is and is not used, and finally statements tending to discredit equipment on which the symbol is not used. It will be seen that these possibilities include advertisements by persons who are authorized to use the symbol, persons who are not so authorized, and persons whose authorization, or the extent of whose authorization, may be in question.

The 3-A symbol is a registered trademark. It is owned by the 3-A Symbol Council. The 3-A Symbol Council can control the manner and extent of its use by authorized persons as a condition to authorization. The Council of course does this to a certain degree. Perhaps the control should be extended to include guide lines as to how the symbol may be properly used in advertising and proscribing improper use.

I have said above that this paper will discuss the legal aspects involved in three areas of actual activity relating to the 3-A sanitary standards and the 3-A Symbol. I wish now to go somewhat beyond such considerations and outline some of the legal aspects of standardization programs in general as used in connection with other activities.

In connection with our consideration of the process of adoption of standards, it was said that of the several varieties of illegal restraints of trade, the one most to be guarded against is that of excluding competitors from a market. As contrasted with the adoption of standards, the use of standards after adoption has at times been complained of, especially when the use is in connection with other activities, as having the effect of fixing prices. This will be explained by analyzing an instructive reported case involving the point – *Tag Manufacturers Institute, et al.* v. *Federal Trade Commission*, to which reference has already been made.

In this case, the Commission had issued a cease and desist order under its Act, and the Institute brought this proceeding for review in the Court of Appeals The Institute is a trade association whose members are manufacturers of approximately 95 per cent of all the paper tags produced in the United States. The members of the association had entered into a series of so-called "Tag Industry Agreements", the last in 1940, in which the subscriber agreed to furnish certain industry statistics to an individual and the latter undertook to serve as a sort of clearing house and to administer the terms of the agreement.

Specifically, the manufacturers agreed to file all their published price lists and terms of sale and revisions thereof with the individual and to report to him currently all sales of tag products, including off-list sales. The individual undertook to disseminate this information to the subscribers. The agreements provided that this information should be available to public agencies, distributors, consumers, and any other interested persons. It was provided also that there should be no limitation upon the right of each subscriber to establish such prices and terms of sale as he should "deem expedient".

I mention this case particularly because one of the activities of the Institute was fostering a more refined standardization of tag products and components thereof. It seems that tag products are of enormous variety, and that even after the basic standardization had been effected, there were still more than 50,000 standard items. The program had been initiated under the auspices of the Bureau of Standards some years before the Institute had been organized, but the Institute had, as indicated, performed an active role later on.

The Commission charged that the agreement was one intended to restrain and eliminate price competition; that this purpose had in fact been effectuated; and that the sum of those activities constituted unfair methods of competition within the Federal Trade Commission Act. In connection with its cease and desist order based upon those charges, one of the Commission's findings was that the administration of the reporting agreement "was materially assisted by the standardization of the component parts of tags and tag products developed and adopted under the auspices of the respondent Institute".

The Court of Appeals set the Commission's order aside. It found that the agreement was not an unfair method of competition since such uniformity of list prices as was shown to exist was not in fact a result of the operation of the agreement. After referring to the Commission's findings as to the part that standardization had played, Chief Judge Magruder's perceptive opinion states:

"These standardizations are deemed to be to the advantage of all concerned, including the consumer, who, among other benefits, is thereby better enabled to know what he is buying

to make intelligent price comparisons. Of course, the detailed standardization of tags and components which the Institute has assisted in developing tends to make more serviceable the information reported to the individual under the Tag Industry Agreement and by him collated and disseminated among the Subscribers. But if the reporting agreement is otherwise lawful, such enhanced usefulness of the agreement as results from standardization would hardly infect it with illegality."

It is undeniably true that standardization may, under certain circumstances, have a tendency to produce similarity of product, and that similarity of product may have a tendency to produce similar prices. However, these similar prices are a result of the necessity of meeting or approximating the lowest price for a similar product, and hence are a result of free competitive forces. Since standardization accompanied by price reporting is not unlawful, how much less so is standardization standing alone. The *Tag Institute* case, however, demonstrates that even a perfectly lawful activity can be given a very bad time when a regulatory agency gains the wrong impression. "Legal aspects" can easily be construed as illegal.

STUDIES ON THE BACTERIOLOGICAL QUALITY OF FROZEN MEAT PIES

II. A COMPARISON OF THE METHODS FOR THE ENUMERATION OF COLIFORMS

KARL KERELUK AND M. F. GUNDERSON

Campbell Soup Company,
Bacteriological Research Department,
Camden, New Jersey

The detection of the presence and enumeration of the numbers of coliform bacteria in frozen foods has become an important part of the bacteriological examination of frozen foods. Breed and Norton (*3*) suggested that the term "coliform" be used to designate the gram negative, lactose-fermenting, aerobic bacteria as a measure of pollution of water. Since its introduction, the coliform group bacteria have been extensively studied in milk, food, and water as indicators of sanitation or contamination. Now they have been carried over into the frozen food field as one of the measurements of bacteriological quality.

From a study of 6,500 strains of the coliform group isolated from various sources, Griffen and Stuart (*7*) stated that the *Escherichia* strains were normal inhabitants of fecal material, while *Aerobacter* strains were typical of nonfecal material. However, they admitted that the latter might, at times, be found in fecal materials but they considered this occurrence to be adventitious.

Elrod (*5*) has demonstrated that a genus of plant pathogens, *Erwinia*, is closely related to the coliform bacteria. He stated that, since the *Erwinia* have the ability to ferment lactose and have an IMVIC (indole, methyl red, Voges-Proskauer, and citrate reactions) pattern similar to that of the *Escherichia-Aerobacter* group, results of some previous investigations were misleading and fecal contamination was not necessarily indicated.

In examining 376 samples of commercially frozen vegetables and cantaloupe for fecal contamination, Burton (*4*) used a presumptive coliform and interococcus test. The coliform bacteria were found to be more dependable than the entercocci for indicating contamination in foods prior to freezing.

Berry (*2*) expressed the need for standardization of methods in bacteriological examination of frozen foods. He considered the use of *Escherichia coli* as a test organism of doubtful value because the organism died during low temperature storage.

Zaborowski *et al.* (*10*) evaluated some of the microbiological methods used for the examination of precooked frozen foods; however, they did not evaluate any of the methods used in the enumerating of coliforms.

In bacteriological surveys of commercially frozen precooked frozen foods, (*6, 8, 9*), several methods were used to determine the number of coliform organisms present: a plating method using violet red bile agar (*9*), desoxycholate lactose agar (*10*), and a most probable number method (*8*) using lactose broth for the presumptive and brilliant green bile broth for confirmatory tests.

The present investigation was undertaken to compare a plating method using desoxycholate lactose agar and the most probable number method in the enumeration of coliforms in frozen meat pies.

EXPERIMENTAL METHODS

The frozen meat pies used in this investigation were purchased at retail markets in the city of Omaha. Samples of the frozen meat pies for bacteriological analysis were obtained by using a stainless steel cheese trier which was previously sterilized by dip-

ping into alcohol and flaming in a Bunsen burner. The sample was placed into a sterile Waring blender and sterile 2 per cent peptone water was added to give a 1:10 dilution by weight. The samples were blended for three minutes and serial dilutions were made from this suspension.

The most probable number (MPN) of coliform bacteria was obtained by adding 10, 1, 0.1 and 0.01 ml. portions of the diluted sample to replicate sets of five lactose broth tubes each. Transfers were made into brilliant green bile broth from all tubes in which gas had formed within 48 hours. Streaks were also made on eosin-methylene blue agar plates from the gas positive lactose broth tubes.

Total counts were determined by plating serial dilutions of the blended suspension with desoxycholate lactose agar (Difco). The plates were overlayed with desoxycholate lactose agar. Characteristic red opaque colonies surrounded by a zone of precipitated bile were counted after a 24-hour incubation period at 35° C.

Colonies were selected and transferred to triple sugar iron agar slants (Difco) from eosin-methylene agar plates and from the highest positive dilution of brilliant green bile broth tubes. After incubation at 37° C. for 48 hours the slants were read. The cultures were tested for indol production, methyl red reaction, Voges-Proskauer and citrate utilization (IMVIC patterns) urease production and motility.

RESULTS AND DISCUSSION

A total of 93 commercially produced frozen meat pies from various manufacturers were examined for the presence of coliform bacteria. In this study an evaluation was made of the most probable number method (MPN) and a pour plate method. These two methods were selected because of their extensive use in the enumeration of coliform bacteria in food materials.

The results of this investigation are tabulated in Table 1. The examination of the results in Table 1 indicate that the MPN method may recover a slightly larger number of organisms than the pour plate method. The confirmatory technique of making streaks on eosin-mehtylene blue agar plates or inoculating brilliant green bile tubes from positive lactose broth tubes gave compariable results.

Though the MPN method recovered a slightly larger number of coliform bacteria than the pour plate method, the pour plate method using either desoxycholate lactose agar or violet red bile agar has its economies in equipment as well as time. The results of the pour plates were obtained in a much shorter period of time. In a preliminary study using desoxycholate lactose agar and violet red bile agar in the pour plates, no significant differences were noted in the total bacterial count. As desoxycholate lactose agar was already being used in this laboratory for the routine isolation and enumeration of coliform bacteria, desoxycholate lactose agar was selected for use in this study. However, it is the author's belief that violet red bile agar gives a more easily discernible coliform colony.

Each frozen meat pie giving a positive test for the coliform group was further investigated in order to determine the most predominant species of coliform bacteria present. Typical coliform colonies were isolated from desoxycholate lactose agar plates and colonies from tryptose glucose extract agar plates streaked from samples of positive tubes of brilliant green bile broth were used for identification studies.

TABLE 1—BACTERIOLOGICAL EXAMINATION OF COMMERCIALLY PRODUCED FROZEN MEAT PIES

Processor	Desoxycholate agar plate count [a]	Most probable number: Brilliant green Bile Broth	Most probable number: Eosin methylene blue agar
Chicken Meat Pies			
A	0	1.5	0
B	0	11	46
C	1,000	16,600	7,200
D	10	62	460
E	66	2.8	46
F	800	2,000	1,100
G	26	700	160
H	10	0	0
I	3	3	0
J	0	4	90
Turkey Meat Pies			
A	10	1.5	4.2
B	10	30	90
C	0	6	7
D	10	60	40
E	4	17	7
F	0	26	30
G	10	97	90
H	0	80	280
Beef Meat Pies			
A	30	45	45
B	7	4	4
C	13	300	127
G	0	7	7
I	7	4	4
J	0	92	126
K	0	17	11
L	3	0	0
Tuna Meat Pies			
B	0	90	60
G	0	7	0
D, L, M	0	0	0

[a] Average of three pies having the same manufacturers code or lot number.

TABLE 2—SPECIES OF COLIFORM BACTERIA ISOLATED FROM FROZEN MEAT PIES

Processor and Samples	Species of coliform bacteria isolated *
Turkey Meat Pies	
A1, A2	*Aerobacter aerogenes* var I.
B1	*Aerobacter aerogenes* var I.
B2	*Escherichia coli* var I
D1, D,3	*Escherichia freundii*
E2	*Escherichia freundii*
	Aerobacter aerogenes var I.
F2	*Aerobacter aerogenes* var I.
G1	*Aerobacter aerogenes* var I.
G2	*Aerobacter aerogenes* var I.
G3	*Aerobacter aerogenes* var I.
	Escherichia coli var I
H1	*Escherichia freundii*
H2	*Escherichia coli* var I
Tuna Meat Pies	
A1	*Escherichia freundii*
B1, B2, B3	*Aerobacter aerogenes* var I
Chicken Meat Pies	
B1, B3	*Aerobacter aerogenes* var I
C1, C2, C3	*Aerobacter aerogenes* var I
	Escherichia freundii
D1, D2, D3	*Escherichia freundii*
F1	*Escherichia coli* var I
G2	*Escherichia coli* var I
H2	*Aerobacter aerogenes* var II
I2	*Aerobacter aerogenes* var II
J3	*Aerobacter aerogenes* var II
Beef Meat Pies	
A1	*Aerobacter aerogenes* var I
C1, C2, C3	*Aerobacter aerogenes* var I
	Escherichia coli var II
J1, J2, J3	*Aerobacter aerogenes* var I

*The differentiation of the members of the coliform group was based on the table given on page 391 of Standard Methods for the Examination of Water, Sewage, and Industrial Wastes, 10th edition, 1955

The identification of the members of the coliform group was based on the table given on Page 391 of *Standard Methods for the Examination of Water, Sewage, and Industrial Wastes* (*1*). The results are recorded in Table 2. The examination of the results in Table 2 indicates that the predominant source of coliform contamination of frozen meat pies was a nonfecal source. Of 37 frozen meat pies demonstrating identifiable coliform bacteria, 30 pies contained a predominance of *Aerobacter* species. Seven of the pies demonstrated the presence of *Escherichia Freundii* varities, which are also of a probable nonfecal origin. Of the 37 pies, seven showed a predominance of *Escherichia coli* varities. These bacteria are usually associated with fecal contamination. About 18 per cent of the frozen meat pies demonstrated a probable fecal contamination while the remaining 82 per cent had a nonfecal or "soil" type of contamination. Whether or not it is necessary to determine if foods are contaminated with a fecal or nonfecal strains of coliform bacteria, the presence of coliform bacteria in frozen foods might indicate whether the foods had been cooked insufficiently or that they were contaminated after cooking or during processing prior to freezing.

SUMMARY

An evaluation of the most probable number method (MPN) and a pour plate method for the isolation and enumeration of the coliform bacteria was conducted on 93 commercially produced frozen meat pies from various producers. The MPN method recovered a slightly larger number of coliform bacteria than did the pour plate method. The MPN method did not demonstrate a sufficiently higher recovery of coliform bacteria to warrant its use in place of a pour plate method.

Predominant species of coliform bacteria recovered from frozen meat pies were demonstrated to be members of the species *Aerobacter*.

REFERENCES

1. American Public Health Association, *Standard Methods for the Examination of Water, Sewage, and Industrial Wastes*, Ed. 10, New York, N. Y. 1955.

2. Berry, J. Bacteriology of frozen foods. Jour. Bacteriol., **51**: 639. 1946.

3. Breed, R. S. and Norton, J. F. Nomenclature for the colon group. Am. Jour. Public Health, **27**: 560, 1957.

4. Burton, M. D. Comparison of coliform and enterococcus organisms as indicies of pollution in frozen foods. Food research, **14**: 434. 1949.

5. Elrod, R. P. The *Erwinia*—coliform relationship. Jour. Bacteriol, **44**: 1942.

6. Ercole Canale—Parola and Ordal, Z. J. A survey of the bacteriological quality of frozen poultry pies. Food Technol., **11**: 578. 1957.

7. Griffen, A. M. and Stuart, C. A. An ecological study of the coliform group. Jour. Bacteriol., **39**: 90. 1940.

8. Larkin, E. P., Litsky, W. and Fuller, J. E. Fecal streptococci in frozen foods. I. A bacteriological survey of some commercially frozen foods. Appl. Microbiol., **3**: 98. 1955.

9. Litsky, W. Fagerson, I. S. and Fellers, C. R. A bacteriological survey of commercially frozen beef, poultry, and tuna pies. Jour. Milk and Food Technol., **20**: 216. 1957.

10. Zaborowski, H., Huber, D. A. and Rayman, M. M. Evaluation of microbiological methods used for the examination of precooked frozen foods. Appl. Microbiol., **6**: 97. 1958.

INSECTICIDE RESIDUES IN MILK AND MILK PRODUCTS[1]

III. INSECTICIDE RESIDUES IN DAIRY PRODUCTS AND ASSOCIATED PROBLEMS

E. H. Marth and B. E. Ellickson

Research and Development Division
National Dairy Products Corporation
Glenview, Illinois

Introduction

Insecticides gain entrance into milk primarily as a result of spraying dairy barns and cattle and ingestion of treated forages by dairy cattle. Information on these subjects has been summarized in two previous papers (*14, 15*). Milks which contain insecticides may be mixed with insecticide-free milk during processing operations and hence the insecticide level of the final product may be changed. This paper will attempt to summarize information on: (*a*) the presence of insecticides in market milk and milk products; (*b*) problems created by the presence of insecticides in dairy products and (*c*) remedial measures which have been taken.

Market Milk

Surveys conducted by the Food and Drug Administration (*5*) in 1948, 1949 and 1951 indicated that trace amounts of DDT were detected in 25 per cent of the market milk samples tested.

In the fall of 1955, 800 samples of market milk, 50 from each of 16 Food and Drug districts, were analyzed for insecticide residues (*5*). Results of this survey showed the following: (*a*) 62 per cent of the samples contained insecticide residues; and (*b*) most residues were present in trace amounts.

One hundred and sixty samples with highest concentration were checked for the presence of specific insecticides. It was found that BHC was present in 60 per cent of the samples, DDT in 54 per cent, lindane in 26 per cent, DDD in 24 per cent, methoxychlor in three per cent and DDE (a breakdown product or metabolite of DDT) in 36 per cent.

Milk samples were checked for anticholinesterase activity to determine the presence of organic phosphate insecticide residues. These insecticides were not detected in the samples tested.

A later survey (*5*) was conducted during the winter of 1956-1957 by the Atlanta, New Orleans, Los Angeles and San Francisco Food and Drug districts. This survey showed little or no contamination of market milk with either BHC or DDT.

A limited survey for the presence of DDT in milk samples obtained from individual producers was conducted by Berruti (*2*) in January of 1958. Residues of DDT in the range of 0.06 to 10.0 p.p.m. were detected in 14 of 59 samples.

Other Dairy Products

Several authors have reported the presence of DDT in butter made from milk which contained residues of the insecticide. Smith, *et al.* (*24*) reported that 65 p.p.m. of DDT was present in butter made from milk which contained 2.3 to three p.p.m. of the insecticide. Higher levels of DDT were found by Schechter, *et al.* (*22*) who reported the presence of 456 to 534 p.p.m. in butter made from milk which contained three to 26 p.p.m. Telford (*25*) reported the presence of DDT in butter made from the milk of a goat which had been fed the insecticide.

Mann, *et al.* (*13*) found the following concentrations of DDT in dairy products made from milk which contained the insecticide: pasteurized cream, 70.2 p.p.m.; buttermilk, 1.9 p.p.m.; whey, 0.5 p.p.m.; butter, 100 p.p.m. and cheddar cheese 47.0 p.p.m.

Benzene hexachloride was found in butter made from milk produced by cows grazing on pastures that were previously sprayed with the insecticide (*16*).

Information about residues of other insecticides in dairy products or about insecticide residues in other dairy products appears to be lacking in the literature. Results of studies on the effect of manufacturing processes on insecticide residues are also scarce. Mann, *et al.* (*13*) reported that pasteurization had very little effect on the amount of DDT in milk.

Problems Created By The Presence Of Insecticides In Milk And Milk Products

The literature fails to cite instances in which insecticide residues in milk have interfered with any of the processes employed in the manufacture of various dairy products. It must be noted, however, that the presence of a wettable DDT powder in milk has been found to interfere with the methylene blue test (*11*).

The presence of insecticides in milk, however, does create public health problems. No entirely "safe" insecticide has been developed. The misuse of any one of them in the production of milk (or the manufacture of milk products) may endanger the health of the consumer.

Chlorinated Hydrocarbon Insecticides

Most reported toxicological studies of this group of insecticides have involved DDT. This insecticide can gain entrance into the bodies of man and animals through absorption from the gastrointestinal tract, the lungs after inhalation and through the skin (*7, 17*). Neal and Von Oettingen (*17*) found no toxic symptoms in humans that were exposed to DDT as an aerosol spray or dust at a rate ten times greater than that which would be normally used. Various types of dermatitis may be associated with exposure of the skin to DDT and its solvents according to Hayes (*7*).

Cases of DDT poisoning are most generally associated with the oral ingestion of the insecticide. Animal experiments have indicated that solvents such as digestible animal or vegetable oils enhance the toxicity of DDT (*7*). When ingested in high concentrations, DDT can cause death in man (*3, 8*) and animals (*26*). If ingested in lower concentrations by man, DDT may produce nausea, apprehension, stiffness in the jaws and throat (*23*), slow pulse, giddiness and dilated pupils (*4*). MacCormack (*12*) reported that his own blood was lethal for lice six and 12 hours after he ingested 1.5 g. of DDT in butter. He only suffered from a few subcutaneous hemmorrhages and this only after exercise.

In animals large doses of orally ingested DDT caused tremors, convulsions, incoordination and death (*17*).

Adult cats who were injected with DDT showed neurologic disorders which involved stiffness, tremor, clonic movements and death (*19*). An autopsy of the cats showed damage to ganglion cells (vacuolar degeneration or pyknosis) and capillary dilation in the liver.

When rats were chronically poisoned with DDT, increases in liver lipids and the size of the liver were noted (*21*). The increase in liver lipids was accompanied by an increase in phospholipids and cholesterol.

Oral dosages of DDT required for the production of illness in man have been reported (*7*). A single dose of 10 mg. per kg. of body weight produced illness in some but not all subjects even when no vomiting occurred. Smaller dosages generally failed to produce illness although perspiration, headache and nausea were noted in an already sickly man who ingested 6 mg. per kg. of body weight. Convulsions have been noted when 16 or more mg. per kg. of body weight were ingested. Dosages as high as 285 mg. per kg. of body weight have been taken without fatal result. Vomiting, however, occurred and hence the dosage was reduced. The least daily dosage, which will lead to illness in man is unknown. Experimental work with animals shows, however, that some individuals might show mild illness if they received 2.5 to 5.0 mg. of DDT per kg. of body weight daily.

DDT was stored in the fatty tissues of all mammals and birds that have been studied (*7*). When a given quantity of DDT was ingested for a period of time, the amount stored in fat gradually increased to a point at which it remained stationary as long as the ingestion rate was constant. If the ingestion rate increased, the quantity stored also increased gradually until a new point was reached at which it again remained stationary as long as the new ingestion rate remained constant.

DDT introduced into the bodies of humans was regularly broken down into DDA (the acetic acid derivative of DDT) and DDE (the dehydrochlorinated derivative) (*7*). The DDA was subsequently excreted in the urine (*18, 23*) while the DDE was stored in the fat. (*7*). Hayes (*7*) noted that a small group of people may become hypersensitive to DDT.

Little information appears in the literature on the toxicity to man of other chlorinated hydrocarbons. Furman (*6*) reported that no toxic signs were seen in cattle which were dipped in benzene hexachloride solutions up to 0.5 per cent concentrations. Ingestion of BHC also failed to produce symptoms of toxicity.

Princi (*20*) reported that there is no essential difference in physiological responses produced by chlorinated hydrocarbon insecticides, hence, information given about DDT is perhaps somewhat applicable to other insecticides of the same general type. Table 1 indicates the toxicity of chlorinated hydrocarbon insecticides to both man and rats. It can be seen that toxaphene and endrin are most toxic and that methoxychlor and perthane are least toxic. The other insecticides of this type rank somewhere in between.

Organic Phosphate Insecticides

This group of insecticides may be absorbed by ingestion, inhalation or through the intact skin (*20*).

Table 1 indicates that parathion and TEPP are high and thiodan is moderately high in toxicity to human beings. Chlorthion, diazinon and malathion are moderate or moderately low in their toxicity to humans.

Early symptoms of organic phosphate poisoning may be any combination of the following: headache, dizziness, blurring of vision, nausea, vomiting, diarrhea, and breathing difficulty (*20*). Later symptoms include profuse sweating, salivation, pulmonary edema with cyanosis, meiosis and convulsions.

Since these insecticides generally are not secreted by cows in their milk even if they are ingested (*14*), it is doubtful whether milk or milk products would be responsible for human intoxications. Gross misuse of the organic phosphate insecticides during the pro-

TABLE 1—TOXICITY RATINGS OF COMMON INSECTICIDES[a]

Insecticide	LD/50-Oral[b]	Toxicity to humans
Chlorinated hydrocarbon		
Aldrin	0.107	Moderately high
Benzene hexachloride	0.960	Moderate
Chlordane	0.732	Moderate
DDT	0.400	Moderate
Dieldrin	0.130	Moderately high
Endrin	0.040	High
Heptachlor	0.144	Moderately high
Lindane	0.200	Moderate
Methoxychlor	9.600	Low
Perthane	9.600	Low
TDE	5.450	Moderate
Toxaphene	0.110	High
Organic Phosphate		
Chlorthion	2.410	Moderately Low
Diazinon	0.200	Moderate
Malathion	1.600	Moderately Low
Parathion	0.005	Very high
TEPP	0.002	Very high
Thiodan	0.144	Moderately high

[a] Information in this table based on data by Lehker (10).

[b] Figures given are the number of ounces of chemical orally administered per 100 pounds of body weight needed to kill 50 per cent of the test rats.

duction of milk or manufacture of milk products could, however, result in the presence of toxic levels in these products.

PRESENT STATUS OF REMEDIAL MEASURES

The Food and Drug Administration has attempted to eliminate certain insecticides from milk by setting tolerance levels for these chemicals at zero p.p.m. Affected by the zero tolerance level are: DDT (*2*) methoxychlor (*1, 9*) and malathion (*1*).

The U.S.D.A. has also attempted to help the situation through its recommendations on insecticide usage (*9*). The chlorinated hydrocarbon insecticides have virtually been eliminated from the list of products suggested for use in the control of insects on dairy cattle. Furthermore, the farmer is cautioned not to feed dairy cattle with plants which have been treated with aldrin, dieldrin, DDT, chlordane or toxaphene.

SUMMARY

Surveys of market milk supplies have shown that 25 to 62 per cent of the samples contained traces or larger amounts of chlorinated hydrocarbon insecticides. Benzene hexachloride and DDT were found most frequently. Organic phosphate insecticides were not found in samples tested.

Highest concentrations of chlorinated hydrocarbon insecticides were found in high-fat dairy products such at butter, cream and cheddar cheese.

DDT and other chlorinated hydrocarbon insecticides were found toxic when ingested in high concentrations and some may bring about chronic intoxication if ingested at low levels over long periods of time. DDT was stored in the fatty tissues of man, other mammals and birds after ingestion. Some people were hypersensitive to DDT.

Organic phosphate insecticides were found to vary from high to moderately low in their toxicity to humans. Milk generally did not contain these insecticides and hence only gross misuse would result in the presence of toxic levels in dairy products.

The Food and Drug Administration has set tolerance levels for DDT, methoxychlor and malathion in milk at zero p.p.m.

REFERENCES

1. Anonymous. Briefs. Food Eng. **30** (4): 27. 1958.
2. Berruti, R. Personal Communication. 1958.
3. Biden-Steele, K. and Stuckey, R. E. Poisoning by DDT Emulsion. Lancet **250**: 235-236. 1946.
4. Chit Thoung, U. Poisonous Effects of DDT on Humans. Indiana Med. Gaz. **81**:432. 1946.
5. Clifford, P. A. Pesticide Residues in Fluid Market Milk. Public Health Reports. **72**:729-734. 1957.
6. Furman, G. P., Toxicity of Benzene Hexachloride to Mammals. J. Econ. Entomol. **40**:518-521. 1947.
7. Hayes, W. J., Jr. Present Status of Our Knowledge of DDT Intoxication Am. J. Pub. Health **45**:478-485. 1955.
8. Hill, K. R. and Robinson, G. A Fatal Case of DDT Poisoning in a Child. Nature **156**:780-781. 1945.
9. Insecticide Recommendations of the Entomology Research Division for the Control of Insects Attacking Crops and Livestock—1958 Season. U.S.D.A. Handbook No. 120. 1958.
10. Lehker, G E. Dictionary of Insecticides and Their Use. Mod. San. Bldg. Maint. **10** (3): 13-14, 45-50. 1958.
11. Lillian, S. J. and Weiser, H. H. The Influence of DDT Wettable Powder on the Methylene Blue Test in Milk. J. Milk Food Tech. **16**:4-5, 8. 1953.
12. MacCormack, J. D. Infestation and DDT. Irish J. Med. Sci. **6**:571-592, 627-634. 1945.
13. Mann, H. D., Carter, R. H. and Ely, R. E. The DDT Content of Milk Products. J. Milk Food Tech. **13**: 340-341. 1950.
14. Marth, E. H. and Ellickson, B. E. Insecticide Residues in Milk and Milk Products. II. Insecticide Residues in Milk from Dairy Cattle Fed Treated Crops. J. Milk Food Tech. **22**:145-149. 1959.
15. Marth, E. H. and Ellickson, B. E. Insecticide Residues in Milk and Milk Products. I. Insecticide Residues in Milk from Treatment of Dairy Cows and Barns. J. Milk Food Tech. **22**: 112-116. 1959.
16. McDowall, F. H., Patchell, M. R., Hurst, F. and Kelsay, J. M. Effect of Treatment of Dairy Pastures with BHC and DDT on Flavor and Composition of Milk, Cream and Butter. New Zealand. J. Sci. Technol. (A) **37**:146-155. 1955.
17. Neal, P. A. and von Oettingen, W. F. The Toxicity and Potential Dangers of DDT to Humans and Warm Blooded Animals Med. Ann. Dist. Columbia **15**: 15-19. 1946.
18. Neal, P. A., Sweeney, T. R., Spicer, S. S. and von Oettingen, W. F. The Excretion of DDT (2, 2-bis-(p-chlorophenyl)-1, 1, 1-trichloroethane) in Man, Together with Clinical Observations. Public Health Repts. **61**:403-409. 1946.

19. Pluvinage, R. J. and Heath, J. W. Neural Effects of DDT Poisoning in Cats. Proc. Soc. Exptl. Biol. Med. 63:212-214. 1946.

20. Princi, F. Chlorinated Hydrocarbon and Phosphate Insecticide Intoxication. Pest Control 23:9-10. 1955.

21. Sarett, H. P. and Jandorf, B. J. Effects of Chronic DDT Intoxication in Rats on Lipids and Other Constituents of the Liver. J. Pharmacol. Exptl. Therap. 91:340-344. 1947.

22. Schechter, M. S., Pogorelskin, M. A. and Haller, H. L. Colorimetric Determination of DDT in Milk and Fatty Materials. Anal. Chem. 19:51-53. 1947.

23. Smith, M. I. Accidental Ingestion of DDT with a Note on Its Metabolism in Man. J. Am. Med. Assoc. 131:519-520. 1946.

24. Smith, R. F., Hoskins, W. M. and Fullmer, O. H. Secretion of DDT in Milk of Dairy Cows Fed Low-Residue Alfalfa Hay. J. Econ. Entomol. 41:761-764. 1948.

25. Telford, H. S. DDT Toxicity. Soap Sanit. Chemicals 21: 161-163, 167-168. 1945.

26. Virgili, R. and Giovanni, M. Quadri Anatomo-Patalogici Nell' Intossicazione Aucta Sperimentale da DDT Con Particolare Riferimento al Sistema Nervoso. Riv. Malariol. 28:107-124. 1949.

Special Service Article

TUBERCULOSIS AND BRUCELLOSIS AS MILK BORNE DISEASES

Editor's Note: Presented herewith is a Special Service Article on Tuberculosis and Brucellosis. Sometimes complacency may exist with regard to these two diseases, transmissible to man. While real progress has been and is being made, this Article indicates the need for constant vigilance. Also presented is a review of the situation as it now stands.

It is a tragic paradox that milk as one of the most important foods in the diet of the American people, is also an important vehicle for the transmission of disease of both human and animal origin. Bovine tuberculosis and brucellosis are probably the two most commonly know animal diseases which are transmitted to humans through the consumption of milk. Both can be completely eliminated in humans only be total eradication of the disease in animals.

TUBERCULOSIS

Tuberculosis is pathogenic to many animals, including mammals, birds, fish and reptiles, yet the only animals from which the disease is transmitted to humans are cattle and goats. (*1*) During the past 40 years, tremendous progress has been made in this country in reduction of tuberculosis in cattle through Federal and State test and slaughter programs. The nationwide incidence has been reduced from a high in 1918 of nearly 5 per cent of the animals and 25 to 50 per cent of the herds tested, to a low in 1952 of 0.11 per cent of the cattle tested. In 1940, the entire nation attained modified accredited status (infection rate of less than 0.5 per cent.) (*2*)

Unfortunately, after reaching modified accredited status, it became more difficult to obtain support for tuberculosis eradication programs, and, of course, during World War II, our fiscal and manpower attention and resources were diverted to the war effort. As a result of cutbacks in tuberculosis testing programs, the incidence of reactors in some States has increased since the war and this trend is expected to continue in certain areas until more intensified testing programs are instituted. In one of the States, the infection rate in cattle tested, rose from a low of 0.18 per cent during the war years to a high of 0.87 per cent in 1956. The average rate of infection in cattle tested in one county in this State rose as high as 5.14 per cent. To correct this condition the State, in cooperation with the U. S. Department of Agriculture, is now testing all cattle in each county as it comes due for accreditation. The State officials are also obtaining information on pretest movement of animals in and out of infected herds as a means of locating and eliminating other possible foci of infection, and tracing back to the herd of origin untested cattle that are slaughtered and show evidence of tuberculosis. Other states are similarly adopting more stringent programs in an effort to reduce infection where the infection rates have indicated that a problem was developing and to eliminate the disease entirely where the infection rate is low. The problem of eliminating the residual foci of infection will be particularly difficult, because of the lack of a rapid and practical method of screening herds for infection, short of periodic testing of all animals in all herds.

MILK BORNE BOVINE TUBERCULOSIS

At this point we might ask the question, is milkborne bovine tuberculosis in this country a serious public health problem? Only isolated cases of this disease

Presented at the Course on Epidemiology of Milkborne Disease, held at the Communicable Disease Center, Atlanta, Georgia, February, 1958.

in humans have been reported during the past few years. Two examples come to mind. In 1954, a farm boy in Michigan was found to have bovine tuberculosis. Upon testing the cattle on the farm, all 17 were found to be reactors and 15 showed gross lesions when slaughtered. In 1948, there was a fairly large outbreak in Ohio which involved 119 school children who consumed raw milk. Dr. Robert Anderson, Chief, Communicable Disease Center,[1] pointed out that although current medical literature contains statements that the role of bovine type tuberculosis is an insignificant one in this country, data is not available to support such statements. He went on to say that, *"The public health importance of animal tuberculosis, it seems to me, cannot be measured with the information we now have. We think bovine tuberculosis in humans is rare. The cases that have come to the attention of the Communicable Disease Center since 1950 — cases confirmed by laboratory study — can be counted on the fingers of one hand. But this communicable disease, that exists in animal hosts closely associated with man, does not announce itself in sudden, dramatic onset, but often develops slowly and can go unrecognized for long periods. Its public health importance must be evaluated by some means more definite than opinion."*

PUBLIC HEALTH CONTROL

In view of the increasing incidence of tuberculosis infection in dairy cattle and in view of the potential hazard of the transmission of the infection to humans through milk consumption, what public health controls are necessary? How can the chain of infection be broken? First and foremost in the prevention of any milkborne disease, is the mandatory pasteurization of all milk. Those states, cities and counties who do not, as yet, have laws or regulations requiring the pasteurization of all market milk and milk products, should certainly pass such regulations without delay. In addition, broad educational campaigns should be conducted by the state or county health departments, directed to the rural population who may consume raw milk from their own cow or dairy herd, or from that of a rural distributor. These public education programs should underscore and reiterate the necessity to either boil or pasteurize such milk before consumption, or use only commercially pasteurized milk. Secondly, it is important that health officials cooperate with livestock disease control officials in the establishment and conduct of effective programs for the eradication of bovine tuberculosis.

MILK ORDINANCE AND CODE PROVISIONS

The Milk Ordinance and Code—1953 Recommendations of the Public Health Service, which provides the basis for milk sanitation regulations in 34 States, 2 Territories, 477 counties and 1,398 municipalities, contains safeguards to prevent transmission of tuberculosis through milk and milk products. Section 7, Item 1r, *Cows - Health*, requires that all milk for pasteurization shall be from herds which are tuberculosis free, or from herds which are located in modified accredited free areas and which have been tested for tuberculosis not more than 6 years prior to the adoption of the Ordinance and at least once every 6 years after such test. All additions to the herds are required to be free from tuberculosis. Tests, retests and disposal of reactors are required to be made in accordance with current USDA requirements. A certificate identifying each animal in a herd is required to be on file as evidence of the tests or retests.

There is currently some question as to whether the tuberculosis provisions of the Ordinance should be revised. Three changes have been proposed by various groups, namely: (1) permit animals from herds located in modified areas to be added to the dairy herd without another test, (2) eliminate the provision which requires test of herds at least once every 6 years and (3) eliminate the requirement that all animals tested be identified. The experience of some states would indicate that testing more frequently than once every 6 years (as required by some states and municipalities) is indicated.

Section 8 of the Ordinance, *Grades of Milk and Milk Products Which may be Sold*, specifies that all milk and milk products for human consumption must be pasteurized. Although pasteurization is a very important and effective safeguard against the transmission of tuberculosis in milk, it is subject to mechanical failure and human errors, consequently, the most effective measure is to completely eradicate the disease from our animal population. Seven states now require pasteurization of all market milk. And in the U. S., currently, ninety-five per cent of market milk is pasteurized.

BRUCELLOSIS

Although brucellosis is primarily an occupational disease, it is transmitted to man through the consumption of raw milk and dairy products from infected animals. Fortunately, since World War II, there has been a gradual decline in the number of cases of human brucellosis reported throughout the country. During the 10-year period 1947-1956, the States reported to the National Office of Vital Statistics, a total of 31,132 cases of brucellosis. A high of 6,321 cases in 1947 decreased gradually to 1,100 cases in 1956. Results of studies in Iowa, Minnesota and Wisconsin and other states have shown a correlation between the incidence of brucellosis in humans and in

different species of animals. A number of state health department officials and medical investigators were invited recently by the Communicable Disease Center to submit their evaluation of brucellosis as a public health problem. A consensus of their views as to the source of human infection was as follows:

Farm Occupational	40%
Raw Milk or Cream	20%
Industry Occupational	20%
Unknown	20%

Reporting on specific epidemiological case-histories by the various state health departments showed that 61 out of a total of 381 cases of brucellosis in humans were attributed to the consumption of infected raw milk.

THREE SPECIES INFECT

Brucellosis in humans and animals is due to infection with any of three species of Brucella, namely *abortus, suis* and *melitensis*. Even though *abortus* is the species most commonly found in cattle, all three may be transmitted through milk. Borts, and others, reported on a milkborne epidemic in Iowa in which 77 cases of human brucellosis was caused by *Brucella suis*. The milk involved in this outbreak came from a herd of 24 cows in which 11 reacted to the blood agglutination test. The organism was isolated from the milk.

There is no known cure for brucellosis in animals, therefore, the only effective means of eliminating the disease in dairy cattle is by vaccination of all calves, and test of all adult animals followed by slaughter of the reactors. Reinfection is prevented by bringing only brucellosis-free animals into the herd. Eradication of brucellosis from beef cattle and swine on the premises and adjoining premises must be done also.

PROGRESS MADE

A great deal of progress has been made in eliminating brucellosis in cattle through the cooperative State-Federal brucellosis eradication program. In recent years this progress has been particularly rapid due to a combination of factors, the most significant of which are (1) the passage of State and local milk regulations requiring brucellosis-free herds for the production of market milk, (2) the introduction of the rapid and economical milk ring and whey tests for screening herds for infection and (3) extensive calf vaccination which is resulting in higher herd immunities.

According to USDA reports the rate of infection for the nation as a whole is declining very rapidly. In spite of an increased concentration of blood testing on BRT suspicious herds, there is still disclosed a significant reduction in percentages for blood reactor cattle and herds. The infection rate for herds tested is now down to about 10 per cent, and for cattle tested is down to 0.16 per cent. The number of States which are attaining certified status is also increasing. Currently, there are 9 states (Conn., Del., Mo., Minn., N. H., N. C., Vt., Wash., and Wisc.) and one territory (Puerto Rico)* which are modified certified brucellosis free. This means that they have less than one per cent infection in the cattle and 5 per cent of the herds. In addition, 441 counties in 27 other states have attained this status. The USDA predicts that at the present rate of eradication, over one-half of the states will be Modified Certified Brucellosis free by 1960.

UNIVERSAL PASTEURIZATION NEEDED

The same public health controls as mentioned above for tuberculosis are equally applicable for preventing the transmission of brucellosis to humans through the consumption of infected milk. Pasteurization or boiling of milk before consumption is a vitally important safeguard and, of course, eradication of the infection in milk producing animals will result in elimination of the disease in humans.

PLAN A AND B

Section 7, Item 1r, of the Milk Ordinance and Code requires that within (from 1 to 5) years after adoption of the Ordinance, all milk and milk products for pasteurization shall be from herds certified by the State livestock disease control authority as following either plan A or plan B approved by the USDA for the eradication of brucellosis. All additions to the herds must be brucellosis-free. A certificate identifying each animal shall be evidence of the above test, and it shall be filed as directed by the health officer. Plan A requires test and prompt slaughter of all reactor animals, and permits vaccination of calves. Plan B permits retention of reactor animals in the herd. Plan B, of course, is not consistent with the definition for milk which specifies that milk is the, *lacteal secretion . . . . obtained by the complete milking on one or more healthy cows* . . . However, at the time this Ordinance was written the incidence of brucellosis in dairy herds was much higher than it is now largely because health departments had not given sufficient attention to the eradication of this disease from dairy herds. To have required dairy herds to be brucellosis-free would have created a severe milk shortage and an economic crisis in some areas. Therefore, is was agreed that for milk which is to be pasteurized it should be permissible to retain the reactor animals in the herd. In this connection, the Code states that, *Ultimately, this ordinance will be revised to require*

* As of May 1959, the following additions should be made: Maryland, Michigan, Nevada, New Mexico, Pennsylvania, Rhode Island, Utah.

all milk-producing herds to be under Plan A; therefore, a dairyman who has brucellosis reactors in his herd is urged to eliminate a sufficient number of such reactors each year so that all reactors will have been removed from the herd within a period of 3 years after his entry into Plan B. A longer period of time may be needed in isolated instances where the incidence of brucellosis in the herd is higher than 50 per cent." The stimulus resulting from more stringent requirements in state and local milk laws and regulations with respect to brucellosis has been much more pronounced than was anticipated. Many states and municipalities already require herds to be free from brucellosis, or have established dates when all of the herds must be brucellosis-free. Livestock disease control officials and the industry are very much pleased with the progress being made and realize that everyone is profiting by the elimination of brucellosis.

PROPOSED REVISIONS

Proposals are currently under consideration for revision of the brucellosis provisions of the Ordinance. These proposals are as follows:

1. Require all dairy herds to be brucellosis-free or be located in a certified area.
2. Require all additions to the herd to be brucellosis-free or from herds located in certified areas.
3. Not require identification of each animal.
4. Discuss the utilization of the milk ring test as an effective screening test for the location of foci of infection.

In conclusion it should be reemphasized that bovine tuberculosis and brucellosis, the two most commonly known animal diseases transmitted to humans through the consumption of milk, CAN be completely eliminated in humans only by total eradication of the disease in animals. Although pasteurization is a very effective safeguard in preventing the transmission of disease through milk, our goal should be the total elimination of the source of infection.

REFERENCES

[1] Anderson, R. J. (1957 *The Public Health Importance of Animal Tuberculosis.* Presented at the Conference on Relationship Between Animal Disease and Human Health, held September 13, 1957, at the New York Academy of Sciences, New York, N. Y.

[2] Steele, James H. and Ranney, Albert F. (1957) *Animal Tuberculosis.* Presented at the Seminar on Veterinary Public Health, held November 25 - December 4, 1957, Warsaw. WHO, Regional Office for Europe.

RAYMOND J. HELVIG, B.S., D.V.M., M.P.H.
ASSISTANT CHIEF, MILK AND FOOD PROGRAM
U. S. PUBLIC HEALTH SERVICE

NEWS AND EVENTS

SOME TIPS ON REPORT WRITING*

There are essentially two kinds of reports, a factual report, one in which facts and related details are given and nothing more. The other is a narrative report which is a detailed presentation of facts or findings, a discussion of those findings and conclusions draw.

Common errors in report writing:

1. Rambling – lacking continuity of thought.
2. Use of impressive words – simple language more readily conveys the ideas and thoughts of the writer.
3. Spelling – one of the most serious of all errors.
4. Reflective or muddled thinking; an implied understanding versus clear thinking.

How to eliminate or correct these errors:

1. List your ideas.
2. Group them into related groups. There generally should not be over three related groups – If more than three groups it may be best to make more than one report.
3. Non-readers are poor spellers. One good informative book should be read each month. This will not only improve spelling but will also be conducive to constructive thinking.
4. Do not exaggerate.

A few rules to be considered for successful writing:

1. Make an outline. Join together sentences of one idea each, and with not more that 10-15 words. (Note: The Reader's Digest is written for 9th and 10th grade level of readers, no sentence contains over 15 words.) Each paragraph should contain only one idea. The first sentence should state the idea, while the remainder enlarges upon or reinforces that idea.
2. Use simple words and phrases. Avoid unneeded words or phrases as: "for purpose of", rather say, "for".
3. Read report aloud – read to another. It should be easy to read and should read smoothly.
4. Incubate – Lay it aside for a day or so then reread and criticize.
5. Write for interest – Simplify. Keep in mind that the report may be read by someone unacquainted with the subject matter.
6. Avoid Jargon, trade terms, professional idioms, etc.
7. Use comfortable words, familiar words, if in doubt as to meaning of a word do not use it.
8. Check Grammer – Most common errors are the use of a singular verb with a plural subject (or the opposite) and the use of wrong verb tense.
9. Edit and rewrite. Five sentences that fully express an idea are better than a whole page of unimportant matter.
10. Keep a file of reports. Reread occassionally and watch for faulty trends.

Helps

A handbook of information is a useful article. One that is free:

"TECHNICAL WRITING TIPS"
BY PUBLIC RELATIONS DIRECTOR
CONSOLIDATED ELECTRIC DYNAMICS CORP.
300 NORTH SIERRA MADRE VILLA
PASADENA

Another Good Aid

"TECHNICAL REPORT WRITING"
BY JAMES SOUTHER
PUBLISHED BY JOHN WILEY

An Indispensable Tool: A Good Dictionary

*Presented by E. Charles Alvarez, Pierce Junior College, at the 40th Annual meeting of the California Association of Dairy and Milk Sanitarian's Refresher Course, Long Beach, Calif., October, 1958.

ENGINEERS REPORT ON SCHOLASTIC GRANTS

Federal Support

The United States Public Health Service administers four major programs, authorized by various Congressional action in recent years, for the purpose of stimulating both research and training in the fields of sanitary engineering and occupational health. These programs are (1) research grants, (2) research fellowships, (3) traineeships, and (4) training grants-in-aid.

Research grants are awarded to individual investigators for the support of research projects in sanitary engineering and related sciences principally to (1) expand research activities and (2) provide research training for personnel. During Fiscal Year 1957, more than 400 individuals shared almost $2,000,000, about 95 percent going to universities and another 4 percent to independent research laboratories.

The program of *research fellowships* is new and is supported initially on a modest scale in 1957. The fellowships are of three types in the broad field of sanitary engineering – predoctoral, postdoctoral, and special. Applicants may have basic training background in engineering or related biological, chemical, and physical sciences. The primary purpose of this program is to increase the number of engineers and scientists qualified to conduct independent research in problems of environmental sanitation. Five such fellowships were awarded during 1957, each worth $1,800 plus tuition plus a family allowance and total-

ing an average of over $4,000. It is planned to double this number of fellowships in the coming year.

The *traineeships*, under Title I of Public Law 911, are available to sanitary engineers, sanitarians, sanitary chemists, and allied personnel wishing to study in a graduate program having definite public health implications. They are intended to bring new people into the field of public health and thus give preference to those with no more than two years' experience in public health, who have had less than one year of graduate or specialized public health training after obtaining their professional degree, and who are under 35 years of age. Approximately 130 traineeships were awarded in the past several years to sanitary engineers, sanitarians, chemists, physicists, industrial hygienists, biologists, and geologists. The average stipend is $4,000.

Training grants-in-aid are awarded under the Air Pollution Research and Technical Assistance Act of 1955. So far, some 14 individuals have been awarded stipends of $4,500 for the purpose of increasing their competence in the prevention and abatement of community air pollution. Eleven grants were made directly to certain educational and training institutions to assist in developing graduate level study in air pollution, and three grants were awarded to air pollution control agencies to pay for the specialized training of certain employees.

All the programs described here, with the exception of research grant activity, are quite new, show great promise, disclose mounting interest, and are slowly expanding. Indication of potential growth may be noted from the actual development of the research grants program. In 1947, six grants totaling $66,284 were awarded in the field of sanitary engineering and occupational health. Ten years later, 73 such grants were awarded, in 1956, totaling $880,853.

Other Federal Agencies

Other Federal agencies provide stipends of various categories for study in a great range of fields, though only a few are peripheral to public health interests as such. The Veterans Administration, National Science Foundation, Atomic Energy Commission, and Department of Defense are the major providers. Other than the famous GI Bill of the Veterans Administration, the financial aid programs of the other Federal agencies are heavily weighted toward postdoctoral research. Even the Public Health Service lends its greatest support in the health field to medical research through grants administered by the National Institutes of Health.

Of particular interest is the program of special fellowships under the aegis of the Oak Ridge Institute of Nuclear Studies. Study leading to the Master's degree in industrial hygiene is supported by $2,500 grants for 10 months plus tuition, other fees and family allowances. Graduate predoctoral fellowships of the National Science Foundation are available to individuals desiring to pursue graduate work in the physical, biological, engineering, and related sciences. Stipends range from $1,400 to $1,800.

In the past few years the Federal Government expended altogether about $50 million in aid to some 43,000 graduate students in 1954-55. Almost half of these were studying in science fields. The largest group of graduate students were employed as research assistants and were working on research contracts or grants awarded to senior investigators at colleges and universities.

Since the emphasis is on research and teaching, Federal funds available for graduate students planning to practice their profession on the job in various communities are, indeed, limited. More, much more, needs to be done in this particular Federal area of assistance.

To this end, it is pertinent to note that a Conference on the Education, Training, and Utilization of Sanitary Engineers was held this past spring in Washington, D. C. The two-day meeting was conducted under the auspices of the Subcommittee on Personnel and Training of the Committee on Sanitary Engineering and Environment, which is a unit of the National Academy of Sciences, National Research Council.

Outstanding educators, engineers, and administrators focused their attention upon a number of problems, including that of financial aid, relating to sanitary engineering personnel and training. Recommendation was made in strongly affirmative tone that graduate-level fellowships and traineeships should be expanded and should carry no restrictions on the duration of training awards to any qualified individual up to and including the Doctoral program. The conference was equally forthright and insistent in its recommendation that Title I of Public Law 911 should be expanded to include financial assistance for the undergraduate education of engineers and should provide a monthly stipend of not less than $100 plus an allowance for tuition and books.

Non-Federal Support

Financial assistance to sanitary engineering graduate students is quite meager in institutions of higher learning. In a survey made recently, by the authors, of all institutions of higher education known to offer training in sanitary engineering, very few provided assistance in this field. Though the data are not exhaustive, they are representative of the nature and extent of aid currently available to graduate students in this field.

A total of 17 schools, three foundations, and four professional organizations offer graduate students scholarships and/or fellowships in which the study

of sanitary engineering is permissable. These schools include the Massachusetts Institute of Technology, California Institute of Technology, Virginia Polytechnic Institute, Rensselaer Polytechnic Institute; the Universities of California (Berkely), Oklahoma, Utah, Washington, Florida, and Michigan; Northwestern, Rutgers, Harvard, Johns Hopkins, and Oklahoma State Universities. This group provides an average of 47 separate stipends, ranging in value from $400 to $4,500 per year. It must be noted that the awards in a few of the above-named universities are closely linked with graduate research requirements.

The American Water Works Association, the American Public Works Association, the National Lime Association, and the National Council for Stream Improvement, each offer a graduate stipend, with value up to $1,500, $1,000, $2,400, and $2,574 per year, respectively. These are specifically for sanitary engineering. The Dorrco Foundation (Rutgers U.) offers a stipend of $2,400 leading to the Ph.D. The Kemper Foundation (Harvard U.) is limited to study in industrial hygiene and carries a sum varying with need and project. The Clow Foundation in the midwest offers a sum up to $1,800 per academic year to a graduate of a college or university in the states of Ohio, Michigan, Illinois, Indiana, Iowa, or Wisconsin. This award is for graduate study in sanitary engineering leading to the Master's degree.

Another sixteen colleges and universities reported the availability of financial assistance. In general, such money is offered in part payment for services rendered in the form of membership on a research team or part-time teaching, and are labelled "research assistantships" or "teaching fellowships." Actually, *most* colleges and universities with graduate programs provide such remuneration, if only of a token nature, in exchange for the "junior faculty" services rendered to overburdened professional teaching or research faculty.

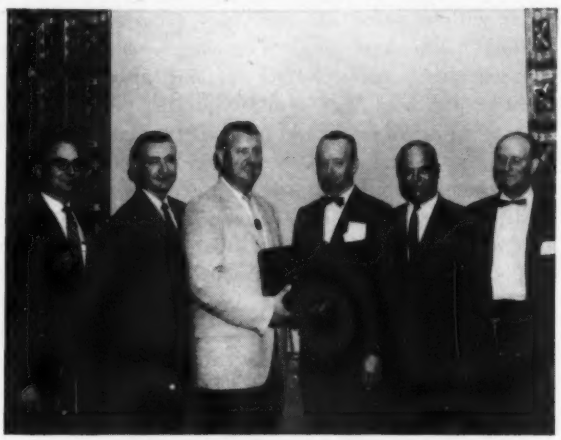
Despite the importance of such assistance, the focus is on the professional teaching or research engineer and not on the young engineer who is to be trained for a career in the community or in industry. Much more attention must be given to this latter group.

Excerpts from: Journal of Sanitary Engineering Division – Proceedings of the American Society of Civil Engineers. Paper 1708

FOLEY ELECTED PRESIDENT OF MISSOURI ASSOCIATION

Vincent Foley, Secretary-Treasurer of International, was elected President of the Missouri Association of Milk and Food Sanitarians during the 27th annual meeting of that Association held April 6-8, at Columbia, Missouri.

The annual meeting consisted of a three day short course in milk and food sanitation. It was co-sponsored by the Department of Dairy Husbandry, College of Agriculture, University of Missouri; The Missouri Division of Health; and the Missouri Association of Milk and Food Sanitarians.



Missouri Association Officers, 1959, left to right; Sec.-Treas., Charles Orr; 1st Vice-Pres., L. R. Miller; retiring Pres., Jerry Cook; Pres., V. T. Foley; 2nd Vice-Pres., Robert Wehmer; Auditor, Floyd Copenhaver.

Twenty-five year awards and diamond studded lapel pins were presented to Milton R. Fisher, D.V.M., Chief of Milk Control, St. Louis Department of Health, and to R. H. Baird, D.V.M., Director of Milk Control, St. Joseph City Health Department. Ten year awards were presented to Ben Meinershagen, D.V.M., Higginsville: Glenn Lotspiech, Senior Sanitarian, Division of Health, and to Floyd Copenhaver, Senior Sanitarian, Kansas City Health Department.

In addition to President Foley, other officers elected were: First Vice President – Lesley Miller, State Division of Health; Second Vice President – Robert Wehmer, St. Louis Health Department; Secretary-Treasurer – Charles Orr, State Division of Health; Auditors – Floyd Copenhaver, and Jerry Cook, the latter being the Association's retiring President.

STANDARDS FOR FROZEN FRUIT CONCENTRATES ANNOUNCED

Food and Drug Administration standards for frozen concentrates to make lemonade have been published recently in the Federal Register. The concentrates are sweetened lemon juice products to which the consumer adds water to make plain or colored

lemonade. A six-ounce can makes a quart. The standards will go into effect in 60 days unless FDA receives objections which require a public hearing.

Comments following publication of proposed standards on June 29, 1957, raised the issue of whether the standards should require some proportion of unconcentrated lemon juice in frozen concentrates for lemonade to produce the kind of taste consumers expect. The California citrus industry favored the requirement and the Florida industry opposed it.

Blindfold tests showed no distinguishable difference in the taste of lemonade made with concentrate alone or concentrate with an added 20 percent of unconcentrated lemon juice. Accordingly, the standards published do not require the use of unconcentrated lemon juice in the frozen concentrates.

The standards do not allow the use of chemical preservatives and reject the industry's proposal for a separate standard for "Industrial Frozen Concentrate for Lemonade" to contain an added chemical preservative. They also limit the use of water and require the product to contain sufficient sugar and lemon juice to make, in accordance with label directions, a beverage with at least 10½ percent of soluble solids and 0.7 percent of acid.

NATIONAL MILK SANITATION ACT HITS AT TRADE BARRIERS

Editor's Note: The bill in question has not been reproduced in toto, but significant sections have been given so milk control personnel can be informed of its main administrative and operational procedures. Readers wishing a copy of H. R. 3840, should direct a request for same to their Congressional Representative.

In February, Representative Lester Johnson of Wisconsin, introduced in the 86th Congress, H. R. 3840 which is a bill: *To amend Public Health Service Act to protect the public health from unsanitary milk and milk products shipped in interstate commerce, without unduly burdening such commerce.* The proposed amendment to the Public Health Service Act now becomes known as TITLE VIII – MILK SANITATION.

Some of the stated provisions and stipulations contained in H. R. 3840 are excerpted and reproduced herewith, to give the reader a better knowledge of the bill's content. These are as follows:

1. The Congress hereby finds that the sanitary control of fluid milk and certain milk products is necessary to protect the public health and recognizes that the exercise of such sanitary control is primarily the responsibility of State and local governments, but that no state or local government has the right to obstruct the free movement in interstate commerce of milk and milk products of high sanitary quality by use of unnecessary sanitary requirements or other health regulations.

2. For the purposes of rating, certification, and listing of interstate milk plants as provided by this title, the Surgeon General (of the Public Health Service) shall by regulation promulgate, and may from time to time amend, a Federal Milk Sanitation Code which shall set forth milk and milk product sanitation standards and sanitary practices (including standards as to inspections, laboratory examinations, and other routine official supervision by local or State milk sanitation authorities, or by both) which, if effectively followed, would in his judgment result in a supply of milk and milk products of a sanitary quality at least equivalent to that of:

(a) Grade A raw milk for pasteurization and Grade A pasteurized milk, respectively, and

(b) Milk products containing only Grade A raw milk as their milk component and intended for pasteurization, and milk products containing only Grade A pasteurized milk as their milk component, respectively, produced or processed, or both, in conformity with the provisions of the edition of the Public Health Service's recommended Milk Ordinance and Code (unabridged form) which is current on the date of enactment of this title.

3. (a) The Surgeon General shall by regulation promulgate, and may from time to time amend, standard rating methods and criteria for determining through compliance ratings, with respect to milk and milk products, the degree to which interstate milk plants and their milk supply comply with the Federal Milk Sanitation Code. Such ratings shall be expressed in terms of percentage of full compliance.

(b) The Surgeon General shall announce, by regulations, the minimum compliance ratings, (pursuant to such rating standards) which, in his judgment, are necessary to give satisfactory assurance that milk and milk products shipped from interstate milk plants receiving such ratings will have been produced, handled, transported, and processed in substantial conformity with the Federal Milk Sanitation Code, except that the minimum so prescribed shall not be less than 90 per centum.

4. Any state milk sanitation agency of any state which wishes to obtain for its interstate milk shippers the benefits of this title shall submit to the Surgeon General for approval a state plan for periodically (but not less often than annually) rating interstate milk plants located in such State, and their milk supply, on the basis of the standard rating methods and criteria in effect under item 3 above, and certifying to the Surgeon General those interstate milk plants receiv-

ing a compliance rating at least equal to the minimum ratings established under this item. Such plan shall be accompanied or supplemented by such information concerning milk sanitation control activities of the state agency and of local official milk sanitation control agencies, and such other revelant information, as the Surgeon General may request.

5. (a) The Surgeon General shall approve a State plan submitted if it meets such requirements as he determines to be necessary to obtain reliable ratings for the purpose of maintaining the list provided for, including a requirement that such ratings will be made only by State rating officials who are full-time employees of the State milk sanitation agency, (or, under interstate arrangements, by full-time employees employed by a sister State having an approved plan or by both States jointly) and hold a currently valid certificate of qualification issued or renewed by the Surgeon General. Approval of a State plan shall be for such period (but not exceeding three years) as may be fixed by regulation.

(b) Whenever the Surgeon General, after reasonable notice and opportunity for hearing to the State milk sanitation agency, finds that:

The State plan has been so changed that it complies with neither the requirements for State plan approval in effect at the time such plan was last approved, nor with the requirements for state plan approval as last amended, or, in the administration of the State plan there is a failure to comply substantially with any provision contained in such plan, the Surgeon General shall revoke his approval of such State plan. The Surgeon General may suspend his approval of a State plan at any time after giving the notice of hearing referred to above and pending such hearing and decision thereon if in his judgment the protection of the public health so requires.

6. (a) The Surgeon General shall establish and maintain a list of certified interstate milk plants, and shall publish such list, or revisions or amendments thereof, not less often than quarterly. Except as provided in subsection (b) all interstate milk plants shall be included on such list, which, by a certificate currently in effect at the time of such listing, have been certified to the Surgeon General by a State milk sanitation agency under an approved State plan as having compliance ratings at least equal to the minimum ratings established by the Surgeon General under item 3 (b). Such list shall identify each interstate shipper, the interstate milk plant or plants involved, and the milk and milk products covered by the certification.

(b) The Surgeon General shall not include or permit to remain on the list provided for under subsection (a) any interstate milk if —

1. the persons having legal ownership or control thereof does not consent to the listing of the interstate milk plant, or

2. the last rating upon which the certification of the plant was based is more than one year old, or

3. the State milk sanitation agency gives written notice to the Surgeon General that the plant is no longer entitled to the minimum rating required for listing, or

4. the Surgeon General, after investigation made on his own initiative or upon complaint of a receiving State or locality, finds that the plant, though duly certified, is not entitled to the minimum rating required for such certification. (Here legal regress is provided for any aggrieved person through usual hearing procedures.)

7. (a) Except as provided in subsection (b) - (1) no milk or milk product which emanates from an interstate milk plant in another State, while such plant is listed by the Surgeon General under item 6 with respect to the milk or milk product, as the case may be, shall be subject to seizure or condemnation in, or to exclusion from, a receiving State or locality, or from transportation, distribution, storage, processing, sale or serving in such State or locality, and (2) no processor, producer, carrier, distributor, dealer, or other person handling such milk or milk product shall be subject to punishment, or to denial of a required license or permit, by reason of the failure of such milk or milk product, or of the sealed container or vehicle (complying with the Federal Milk Sanitation Code) in which such milk or milk product was brought into the State, or of an interstate milk plant in another State or its milk supply, or of any transportation or handling facility, in which such milk or milk product was produced, processed, carried, or handled, to comply with any prohibition, requirement, limitation, or condition (including official inspection requirements) relating to health or sanitation and imposed by or pursuant to any State or local law, regulation, or order of the receiving State or locality, or by any officer or employee thereof. In the event any milk or milk product emanating from a listed interstate milk plant in another State and complying with the Federal Milk Sanitation Code is commingled with milk or milk products from within the receiving State provisions of the preceding sentence shall apply to the resulting mixture, except that nothing in this section shall be construed to prevent the application of such State or local laws, regulations, or orders to such mixture by reason of the failure of such milk or milk product of intrastate origin not emanating from an interstate milk plant in another State, to comply therewith immediately prior to such commingling.

(b) Subsection (a) shall not be deemed to prohibit any receiving State or locality from:

1. subjecting any milk or milk product upon its arrival from another State, to laboratory, or screening tests in accordance with standard methods for the examination of dairy products provided for in the Federal Milk Sanitation Code, and rejecting the shipment if upon such examination it fails to comply with the bacterial and coliform count standards, temperature standards, composition standards, and other criteria of such Code relating to the then physical condition of such milk or milk products, and

2. enforcing sanitary laws and regulations, equally applicable to milk or milk products not coming from outside the State —

a. to require pasteurization of raw milk brought into the State before delivery to retail sale or consumer-serving establishments or before use in making products with milk or milk products,

b. to otherwise protect milk or milk products from contamination or deterioration after arrival through requirements as to temperature and sanitary handling, transportation, and storage: Provided, that the State or locality may not, except as provided in subparagraph (c) reject the sealed container or vehicle, as such, in which the milk or milk product arrived in the State, if it complies with the Federal Milk Sanitation Code, or as to type of container in or from which milk or milk products may be sold at retail or served to consumers.

8. (a) The Surgeon General may make such inspections of interstate milk plants and plants proposing to become interstate and of their milk supply, and such laboratory examinations, studies, investigations, and ratings, as he may deem necessary in order to carry out his functions under this title and to promote uniformity in the application of the Federal Milk Sanitation Code and the Surgeon General's standard rating methods and criteria.

(b) The Surgeon General shall remove any interstate milk plant from the list provided for under item 6 if the State or any local milk sanitation authority or laboratory refuses to permit representatives of the Service to inspect and copy relevant records pertaining to State or local health and sanitary supervision of such milk plants or any part thereof or facility connected therewith and their milk supply, or if the person in charge of such plant or if any part of the milk supply of such plant, or any person under his control, refuses to permit representatives of the Service, at all reasonable times—

1. enter such interstate milk plant or any establishment, premises, facility, or vehicle where milk or milk products intended for such interstate milk plant are produced, processed, packed, held or transported,

2. inspect such plant, establishment, premises, facility, or vehicle, and all pertinent personnel, dairy animals, equipment and utensils, containers and labeling, and milk and milk products, and

3. inspect and copy pertinent records.

9. The Surgeon General shall conduct research, studies, and investigations concerned with the sanitary quality of milk and milk products, and he is authorized to (1) support through grants, and otherwise aid in, the conduct of such investigations, studies, and research by State agencies and other public or private agencies, organizations, institutions, and individuals, and (2) make the results of such research, studies, and investigations available to State and local agencies, public or private organizations, and institutions, the milk industry, and the general public.

10. The Surgeon General is authorized to

1. train State and local personnel in milk sanitation methods and procedures and in the application of the rating methods and procedures and criteria established,

2. provide technical assistance to State and local milk sanitation authorities on specific problems,

3. encourage, through publications and otherwise, the adoption and use, by State and local authorities throughout the United States, of the sanitation standards and sanitation practices specified in the Federal Milk Sanitation Code, and

4. otherwise cooperate with State milk sanitation authorities, other public and private organizations and institutions, and industry in the development of improved programs for the control of the sanitary quality of milk and milk products.

The bill proposes an appropriation, not to exceed $1,500,000 annually to enable the Surgeon General to carry out his functions under the Act.

Excerpts from a statement by Representative Johnson when he introduced H. R. 3840.

The bill which I am introducing today has been drafted so as to conform to the recommended principles adopted by the Association of State and Territorial Health Officers. This Association, as its name indicates, is composed of State and other sanitation officials and health officers. It has studied this matter carefully and has developed and adopted a set of recommended principles for Federal milk sanitation legislation. These recommended principles were formally adopted at the Annual Convention of the Association in Washington, D. C., October 24-28, 1958. I am asking unanimous consent to have the report included in the Record after my remarks.

The current bill does not require any State or municipality to adopt the U. S. Public Health Serv-

IODINE SANITIZERS OFFER ALL THESE ADVANTAGES

A LONG RECORD OF DEPENDABILITY. Iodine is recognized as a most efficient antiseptic and germicide. It is known to be effective against a wide range of organisms. New technology has now resulted in more efficient iodine formulations developed especially for sanitization.

SPECIALIZED PRODUCTS. Iodine sanitizers and detergent-sanitizers are offered by leading manufacturers for treatment of milk, food and beverage utensils and equipment. Also available are iodine disinfectant-cleaners for hospitals, schools, institutions, food and beverage plants, and industrial applications.

EFFECTIVE. Iodine sanitizers are effective in low concentrations. Their use can contribute to improved public health.

EASY TO TEST. The well-known iodine color is an indication of solution strength. When the color of an iodine sanitizing solution begins to disappear, that is a signal to replenish or replace the solution. There is no reason ever to let an iodine solution get too weak to be effective. Test kits are available.

Write us for further information and names of manufacturers offering iodine sanitizers and disinfectant-cleaners in your area. No obligation, of course.

CHILEAN IODINE EDUCATIONAL BUREAU, INC. Room 2159 120 Broadway, New York 5, N. Y.

ice Milk Ordinance and Code, nor does it require that all fluid milk and fluid milk products shipped in interstate commerce meet the requirements of the Code.

The bill does provide, however, that any milk which does meet the requirements of a Federal milk sanitation code, the promulgation of which is provided for in the bill, cannot be excluded from any State or fluid milk market in the United States. State and local health authorities under this bill will still inspect out-of-state supplies of milk which are not qualified under the U. S. Code, if they so desire. But no State or local health authority can prevent the entry of milk which does qualify under the Code.

The bill also provides for many safeguards in areas receiving milk from plants qualified under the Code. They have the right of inspection of milk upon arrival to see that it has not deteriorated in transit, and after arrival, the handling, processing, and sale of such milk must meet the requirements applied to milk entering such markets from intrastate sources.

I feel that this bill will go far towards eliminating the use of sanitation regulations as economic trade barriers which have been and are widely prevailent in this country, while at the same time protecting and maintaining the rights and prerogatives of State and local health authorities in respect to milk originating within respective jurisdictions.

STUDY REVISION OF PHS DRINKING WATER STANDARDS

On March 24-25 a group of physicians, scientists, engineers, and administrators met in Washington, D. C., to consider revision of the U. S. Public Health Service Drinking Water Standards. In view of changes in the nature and extent of impurities which are being added to the nation's supplies as a result of greater population growths and even greater technological and industrial development, the Public Health Service has appointed this Advisory Committee to re-evaluate these Standards, which were first formulated 45 years ago and last revised in 1946.

The Public Health Service Drinking Water Standards were originally written t oapply only to water used on interstate carriers and this remains their only legal basis. However, State health departments, the American Water Works Association, and the Armed Forces have accepted them as standards for public water supplies. This general acceptance makes it mandatory that they be kept current andt hat the basic knowledge required to deal with new problems be developed before problems become acute. In considering standards for limiting impurities in drinking water at this time, special attention was given at this meeting to the problem involved in setting limits for nonliving contaminants such as radionuclides and synthetic organics and other chemicals. This was the first of a series of meetings scheduled for coming months by the Advisory Committee.

PIPE LINE MILKING SYSTEMS DISCUSSED AT RECENT MEETINGS

Milk sanitarians from several sections of the country have attended six meetings at St. Charles, Illinois. These consisted of a short course on planning, installing, cleaning and sanitizing of pipe line milking equipment on the dairy farm.

These one-day meetings, sponsored by Babson Bros. Co. and held at the Surge Training Center, look into dairy sanitation requirements of the future.

One of the high points is a question and answer period where milk sanitation problems of mutual interest are discussed.

The meetings started March 24 with milk sanitarians from Wisconsin attending. They were concluded May 7 with sanitarians from the Southeastern states in attendance. Future meetings may be held to give broader geographical coverage.

CLASSIFIED ADS

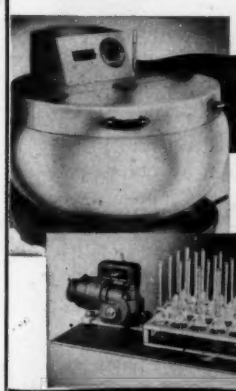
FOR SALE

Single service milk sampling tubes. For further information and a catalogue, please write Bacti-Kit Co., P. O. Box 101, Eugene, Oregon.

PUBLIC HEALTH SANITARIAN — Work in generalized program at Hammond Health Department; city of 108,000 population, 20 miles from downtown Chicago. Full time city health department. Must have college degree. Apply: Hammond Health Department, City Hall, 5925 Calumet Avenue, Hammond, Indiana.

IOSAN reduces bacteria counts to consistent lows. Removes and prevents milkstone buildup. Simplifies sanitation. Replaces two or more products because it is both a powerful cleaner and sanitizer.

IOSAN is the original patented "Tamed Iodine"® Germicidal Cleaner. Used daily by tens of thousands of milk producers. Especially effective for Bulk Tanks. For a free demonstration contact your regular supplier or **Lazarus Laboratories Inc., Div. West Chemical Products Inc., 42-16 West St., Long Island City 1, N. Y.**



Consistently Accurate!

GARVER

Milk & Cream Testing Equipment

Faulty testing equipment can turn profit into loss—fast. Insure now against inaccuracy with this efficient Garver combination.

1. Garver "Super" Babcock Tester. Speed controlled and speed indicated for extreme accuracy.

2. Garver "ovate action" Test Bottle Shaker. Thoroughly integrates test ingredients—saves time—eliminates dangerous, haphazard hand twirling.

Write today for catalog.

THE GARVER MANUFACTURING CO.
Union City, Indiana, U.S.A.

"Babcock Tester Manufacturers for Four Decades"

The Only Approved Method of Applying a Sanitary Lubricant to Food Processing Equipment

HAYNES Lubri-Film SPRAY

PRODUCT AND PROCESS PATENTED
U.S. Pat. Nos. 2,637,720 — 2,638,187 — 2,638,205 — 2,771,361 — 2,865,666
Other Pat. Pending
Also Foreign Patents

A SANITARY PLASTIC TYPE SOLID FILM LUBRICANT

FORMULATED FROM U.S.P. LIQUID PETROLATUM AND OTHER APPROVED INGREDIENTS
(Laboratory Controlled)

SANITARY • NON-TOXIC
ODORLESS • TASTELESS

PHARMACEUTICALLY ACCEPTABLE

CONTAINS NO ANIMAL OR VEGETABLE FATS. ABSOLUTELY NEUTRAL. WILL NOT TURN RANCID —CONTAMINATE OR TAINT WHEN IN CONTACT WITH FOOD PRODUCTS.

Lubri-Film should be used to lubricate

- Separator Bowl Threads
- Pure-Pak Slides & Pistons
- Pump & Freezer Rotary Seals
- Homogenizer Pistons
- Sanitary Plug Valves
- Valves, Pistons & Slides of Ice Cream, Cottage Cheese, Sour Cream and Paper Bottle Fillers, Stainless Steel Threads and Mating S. S. Surfaces
- and for all other Sanitary Machine Parts which are cleaned daily.

Haynes *Lubri-Film* Sanitary Spray Lubricant is entirely new and different. Designed especially for applications where a heavy duty sanitary lubricant is required.

Lubri-Film is a high polymer lubricant and contains no soap, metals, solid petrolatum, silicones nor toxic additives.

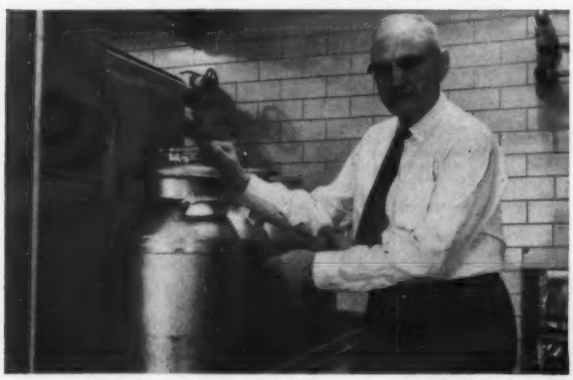
Provides a clinging protective coating for vital metal parts such as slides, bearings and other lubricated surfaces despite moisture.

PACKED 6—16 OZ. CANS PER CARTON.

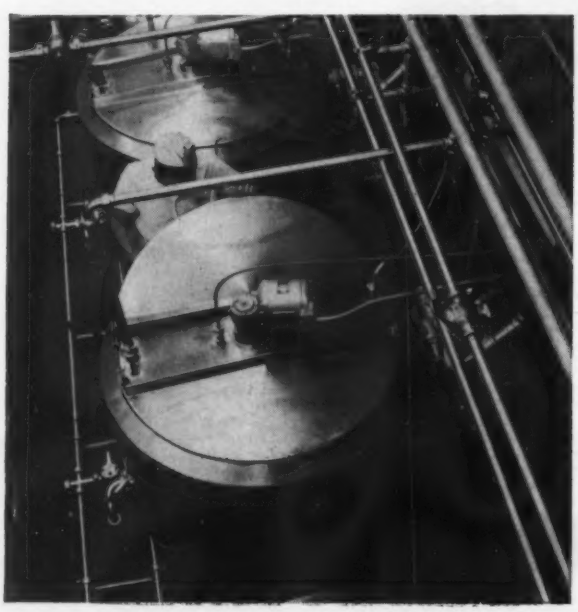
THE HAYNES MANUFACTURING CO.
4180 Lorain Avenue • Cleveland 13, Ohio

Dairy sells more milk at lower cost

"We figure we're saving over $750 a year in retinning costs alone by using Stainless Steel milk dispensing cans." says Mr. Darrell M. Hendrickson, Sales Manager of the Michigan State University Dairy Plant in East Lansing, Michigan. "Stainless Steel cans do not require retinning. We save time by not having to inspect the cans for corroded spots; there's never any danger of corrosion with Stainless Steel.



"Stainless Steel can't be beat for cleanliness and sanitation . . . so important in every dairy. Our entire plant is equipped with Stainless Steel."



"Another Stainless Steel product that we highly approve of for greater profits and customer satisfaction is the bulk milk dispenser. By buying milk in bulk, our customers are saving as much as 1¼¢ *on every portion they sell.* They like the cleanliness and convenience of Stainless Steel bulk dispensers; and the milk is always cold and fresh. There's no problem of handling and storing numerous containers. We both sell more milk at a higher profit.

If you would like to have more information about dispenser cans or bulk dispensers, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. *USS is a registered trademark*

USS

United States Steel Corporation – Pittsburgh
American Steel & Wire – Cleveland
National Tube – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

United States Steel

INDEX TO ADVERTISERS

Babson Bros., Co. ..... Back Cover
Baltimore Biological Laboratory;
Division of Becton, Dickinson & Co. V
Creamery Package Mfg. Co. ..... Inside Back Cover
Chilean Iodine Educational Bureau, Inc. ..... Page 192
Chr. Hansen's Laboratory, Inc. VII
Difco Laboratory, Inc. VIII
Glasco Corp. VIII
Johnson & Johnson I
Klenzade Products, Inc. VI
Ladish Co. - Tri Clover Division .. Inside Front Cover
Lazarus Laboratories, Inc., — Division
West Chemical Co. ..... Page 192
Pennsalt Chemicals Corp. IV
The Garver Mfg. Co. ..... Page 193
The Haynes Co. ..... Page 193, VII
The Heil Co. VI
United States Steel ..... Page 194
U. S. Stoneware II
Vitex Laboratories — Division
Nopco Chemical Corp. IV

QUICK — DIRECT FROM SEED
ACTIVE — TO MOTHER CULTURE
READY-TO-GO — TO BULK

"HANSEN'S"
DRI-VAC
100% ACTIVE CULTURE

"Hansen's" Dri-Vac Lactic Culture is a vastly improved culture in highly soluble powder form — 100% dried seed culture — without fillers or carriers. Dri-Vac can be used on the first propagation . . . from seed . . . to mother culture . . . to bulk. No further development needed. Excellent keeping quality. Easy to use.

Made in a Variety of Lactic Combinations
Write for Available Unrelated Strains

CHR. HANSEN'S LABORATORY, INC.
9015 W. MAPLE STREET — MILWAUKEE 14, WIS.

HAYNES SNAP-TITE GASKETS

"FORM-FIT" WIDE FLANGE HUGS STANDARD BEVEL SEAT FITTINGS
MOLDED TO PRECISION STANDARDS
DURABLE GLOSSY SURFACE
DESIGNED TO SNAP INTO FITTINGS

LOW COST...RE-USABLE
LEAK-PREVENTING
NEOPRENE GASKET for Sanitary Fittings

Check these SNAP-TITE *Advantages*

Tight joints, no leaks, no shrinkage
Sanitary, unaffected by heat or fats
Non-porous, no seams or crevices
Odorless, polished surfaces, easily cleaned
Withstand sterilization
Time-saving, easy to assemble
Self-centering
No sticking to fittings
Eliminate line blocks
Help overcome line vibrations
Long life, use over and over

Available for 1", 1½", 2", 2½" and 3" fittings.
Packed 100 to the box. Order through your dairy supply house.

THE HAYNES MANUFACTURING CO.
4180 Lorain Avenue • Cleveland 13, Ohio

THE ONLY *Approved* SANITARY METHOD OF APPLYING A U. S. P. LUBRICANT TO DAIRY & FOOD PROCESSING EQUIPMENT

Haynes-Spray

U. S. P. LIQUID PETROLATUM SPRAY
U.S.P. UNITED STATES PHARMACEUTICAL STANDARDS

CONTAINS NO ANIMAL OR VEGETABLE FATS: ABSOLUTELY NEUTRAL. WILL NOT TURN RANCID — CONTAMINATE OR TAINT WHEN IN CONTACT WITH FOOD PRODUCTS.

SANITARY — PURE
ODORLESS — TASTELESS
NON-TOXIC

This Fine Mist-like HAYNES-SPRAY *should be used to lubricate:*

SANITARY VALVES
HOMOGENIZER PISTONS — RINGS
SANITARY SEALS & PARTS
CAPPER SLIDES & PARTS
POSITIVE PUMP PARTS
GLASS & PAPER FILLING MACHINE PARTS
and for ALL OTHER SANITARY MACHINE PARTS which are cleaned daily.

The Modern HAYNES-SPRAY *Method of Lubrication Conforms with the Milk Ordinance and Code Recommended by the U. S. Public Health Service*

The Haynes-Spray eliminates the danger of contamination which is possible by old fashioned lubricating methods. Spreading lubricants by the use of the finger method may entirely destroy previous bactericidal treatment of equipment.

PACKED 6-12 oz. CANS PER CARTON — SHIPPING WEIGHT—7 LBS.

THE HAYNES MANUFACTURING CO.
4180 Lorain Avenue • Cleveland 13, Ohio

YOUR INSPECTION IS INVITED!

Glasco Model GDV-1M4
Dairy Vendor

Glasco® DAIRY VENDORS

- Have Certificate of Approval of National Sanitation Foundation Testing Laboratory (Ann Arbor, Mich.).
- Comply with required standards of the United States Public Health Service Ordinance and Code, "The Vending of Foods and Beverages."

HOW GLASCO DAIRY VENDORS PROTECT PATRONS' HEALTH:

1. Coin-operated Glasco Dairy Vendors vend bulk milk and other dairy products in cups, automatically, with no exposure to air or human contact. Their compact, simplified design assures clean, trouble-free operation.

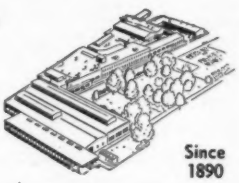
2. All drinks are prepared and placed in sealed milk cans at the licensed milk plant, using milk of at least 3½% butterfat content.

3. All parts in contact with cups or drinks are either disposable or easily cleaned: i.e., re-sanitized 5-gal. dispenser cans and disposable (single-service) dispensing tubes.

4. In the Vendor, dispenser cans are kept in a refrigerated compartment at constant 33-35°F. Vendor will not operate in case refrigerated compartment rises above 50°F. Switchover from empty to full dispenser cans is fully automatic.

5. Paper cups are stored in unbroken stacks in an enclosed compartment. They are filled in an enclosed cup station with a self-closing door.

WRITE TODAY for the complete sanitation story on Glasco Dairy Vendors.



Since 1890

Manufactured and sold by

GLASCO CORPORATION

MUNCIE, INDIANA

DIFCO

Antisera and Antigens

Enteropathogenic Coli · Klebsiella · Salmonella · Shigella

Brucella · Leptospira · Streptococci

★

C Protein Antiserum and Standard

★

Infectious Mononucleosis Antigens and Standards

Potent Stable Specific

Descriptive literature available on request

Specify

DIFCO LABORATORY PRODUCTS

BIOLOGICS CULTURE MEDIA REGEANTS

CUMULATIVE ROSTER
OF
HOLDERS OF AUTHORIZATIONS TO USE THE 3-A SYMBOL
(AS OF JUNE 20, 1959)

Because the intermittent appearance of the names and addresses of concerns to which 3-A Symbol Administrative Council authorizations have been issued, as well as changes in addresses and model numbers covered, in separate issues of the Journal of Milk and Food Technology, makes reference difficult, the Council has adopted the policy of publishing the complete list at annual intervals, with publication of additions and changes at the corresponding semi-annual intervals. The initial complete list, as of June 20, 1959, follows.

C. A. Abele
Secretary-Treasurer
3-A Symbol Administrative Council

Authorization Numbers	Concern and Address	Models Covered
	DISPENSERS — MANUALLY-OPERATED — 1500	
74	American Industries, Inc., 5614 W. 36th Street, Minneapolis 14, Minnesota.	B-5, B-10, and B-15.
23	Monitor Dispenser Co., Inc., 22 Depot Square, Montclair, N. J.	MF 20-1 and MF 20-2.
62	Norris Dispensers, Inc., 2720 Lyndale Ave., So., Minneapolis 8, Minnesota.	N-5-SM, N-10-SM, and N-15-SM.
108	Stevens-Lee Company, 314 W. 90th Street, Minneapolis 20, Minnesota.	Silver King Imperial SK1, SK2, and SK3.
68	United Refrigerator Company, Hudson, Wisconsin.	UM: 57, 107, and 157. UMT: 57, 107, and 157.
	ELECTRIC MOTORS AND ATTACHMENTS — 0600	
113	The Louis Allis Company, 427 East Stewart Street, P. O. Box 2020, Milwaukee 1, Wisconsin.	DI and D: Built in 203, 204, 224, 225, 254, 284, 324, 326, 364, and 365 frames.
77	Electra Motors, Inc., 1110 North Lemon Street, Anaheim, California.	No. 66: 1001-S, 1006-S, 4211-S, 4216-S, 4221-S, 4222-S, 4226-S, 4227-S, 4232-S, 4237-S, 4711-S, 4712-S, 4716-S, 4717-S, 5211-S, 5216-S, 5221-S, 5222-S, 5226-S, 5227-S, 5232-S, 5237-S, 5711-S, 5712-S, 5716-S, 5717-S, and 6112-S. No. 182: 1001-S and 1006-S. No. 184: 1001-S, 1006-S, 4232-S, 4237-S, 4242-S, 4247-S, 5232-S, 5237-S, 5242-S, 5247-S, and 6112-S. No. 213: 1001-S, 1006-S, 4231-S, 4236-S, 4241-S, 5231-S, 5236-S, 5241-S, and 6121-S. No. 215: 1001-S, 1006-S, 4242-S, 4247-S, 5242-S, 5247-S, and 6122-S.
	EVAPORATORS AND VACUUM PANS — 1600	
111	Blaw-Knox Company— Dairy Equipment Division, Mora, Minnesota.	D-60-R and D-60-IR to D-600-R and D-600-IR.
110	Arthur Harris & Company, 210-18 No. Aberdeen Street, Chicago 7, Illinois.	Model numbers not employed.
106	Henszey Company, 202 No. Water Street, Watertown, Wisconsin.	Evaporators: 36T, 55T, 85T, 120T, 150T, 198T, 252T, and 378T. Vacuum Pans: 36", 42", 48", 60", 72", and 84".
107	C. E. Rogers Company, 8731 Witt Street, Detroit 9, Michigan.	Single-, double-, and triple-effect Evaporators. 28", 36", 42", 4', 5', and 6' Vacuum Pans.

Authorization Numbers	Concern and Address	Models Covered
	FILTERS USING DISPOSABLE MEDIA — 1000	
35	Tri-Clover Div.-Ladish Co., 2809—60th Street, Kenosha, Wisconsin.	100F, 200F, 300F, 600E, 700E, 800E, 900E, 701E, 801E, and 901E, with ¼" perforations.
	FITTINGS — SANITARY PIPING — 0800-0806	
79	Alloy Products Corporation, 1045 Perkins Avenue, Waukesha, Wisconsin.	2C, 2CG, 2F, 2FG, 2K, 2KG, 2P, 2PG, 7, 7G, 7A, 7AG, 7B, 7BG, 9, 9G, 10BF, 10BFG, 10C, 10CG, 11C, 11CG, 12R, 12RU, 13H, 13SH, 14R, 14RG, 15R, 15RG, 16A, 16AG, 30F, 30FG, 31-15, 31-15G, 32-15, 32-15G, 33F, and 33-FG.
82	Cherry-Burrell Corporation, Mill Street, Little Falls, New York.	2C, 2CG, 2CI, 2CQ, 2F, 2FG, 2FI, 2FQ, 2FQ14, 2FQ15, 2K, 2KG, 2KI, 2KQ, 2P, 2PG, 7, 7A, 7AG, 7B, 7BG, 7CI, 7DI, 7G, 7I, 7XG, 7XQ, 9, 9A, 9AG, 9G, 91X, 9XQ, 10BF, 10BFG, 10C, 10CG, 10CI, 10CL, 10CLG, 10CQ, 10F, 10FL, 10FQ, 11C, 11CG, 11CI, 11CL, 11CLG, 11CQ, 11CQL, 11PC, 12R, 12RU, 13H, 13I, 13Q, 13SH, 14R, 14RG, 14RI, 14RQ, 14W, 14WI, 14WQ, 15R, 15RG, 15RI, 15W, 15WI, 16A, 16AI, 16AQ, 30F, 30FG, 31-15, 32-14, 32-14Q, 32-15, 32-15G, 33-F, 33FG, 60CI, 60CTQ, 60RC, 60RCI, 60RCIQ, 60RT, 60RTTI, 60RTTQ, 60TM, 60TP, 60TPT, 60TR, 60TTI, 60TTQ, and #66721.
67	G & H Products Corporation, 2409—52nd Street, Kenosha, Wisconsin.	2C, 2CG, C2C, GH2C, 2E, 2EG, C2E, 2F, 2FG, C2F, 2F-31, 2F-31G, C2F-31, 2F-32, 2F-32G, C2F-32, 2K, 2KG, C2K, GH2K, 2P, 2PG, C2P, 7, 7G, C7, GH7, 7A, 7AG, C7A, 7B, 7BG, C7B, 7X, 7XG, C7X, 7AX, 7AXG, C7AX, 7BX, 7BXG, C7BX, 9, 9G, C9, GH9, 9A, 9AG, C9A, 10BF, 10BFG, C10BF, 10C, 10CG, C10C, GH10C, C10F, 11C, 11CG, C11C, GH11C, 12H, 12HR, C12HR, 13H, C13H, 13SH, GH14HT, 14R, 14RG, C14R, GH14R, 14W, 14WG, C14W, GH14W, 14WL, 14WLG, C14WL, 15R, 15RG, C15R, 15W, 15WG, C15W, 15WL, 15WLG, C15WL, 16A, 16AG, C16A, GH16A, 17C, 17CG, C17C, 17D, 17DG, C17D, 17E, 17EG, C17E, 17F, 17FG, C17F, 17G, 17GG, C17G, 17H, 17HG, C17H, 17K, 17KG, C17KG, GH17PC, GH17TC, 28A, 28AG, C28A, 28B, 28BG, C28B, 30F, 30FQ, 30FQF, 30S, 30SA, 30SW, 30SLW, 31R, 31RG, C31R, 31-14, 31-14G, C31-14, 31-14F, 31-14FG, C31-14F, 31-15, 31-15G, C31-15, 31-15F, 31-15FG, C31-15F, GH31CC, GH31PC, GH31CP, GH31TC, GH31CT, 32R, 32RG, C32R, 32-14, 32-14G, C32-14, 32-14F, 32-14FG, C32-14F, 32-15, 32-15G, C32-15, 32-15F, 32-15FG, C32-15F, GH32CC, GH32PC, GH32CP, GH32TC, GH32CT, 33F, 33FG, C33F, 45H, 45HG, C45H, 45V, 45VG, C45V, 46, 46G, C46, 50, 50G, C50, 60C, 60CG, C60C, GH60CM, GH60CR, 60RC, 60RCG, C60RC, 60RT, 60RTG, C60RT, 60T, 60TG, C60T, GH60TM, 60TFQ, 60TFQG, C60TFQ, 60TTF-A, 60TTF-S, 60Y, 60YG, C60Y, GH60YM, 60YRFA, GH60TR, GH60YR, GH2CS-5, SV412C-2", SV412D-3", SV423-B, SV445-B, 193-1½", 193C-1½", A-60SCM, A-60SCCM, A-60STM, A-60STCM, A-60SYM, G-60SCM, G-60SCCM, G-60STM, G-60STCM, G-60SYM, 60S-7DD7M, 60S-7DD9M, 90S-9DD7M, 90S-9DD9M.
105	Girton Manufacturing Company, Millville, Pennsylvania.	Girton Lever Lock Valve.
100	Ladish Co.-Fesco Division, 228 E. James Street, Barrington, Illinois. (Formerly Food Equipment & Specialties Company).	61-10-0, 61-20-0, 61-21-0, 61-40-0, 71-10-0, 71-20-0, 71-21-0, and 71-40-0.
73	L. C. Thomsen & Sons, Inc., 1303—43rd Street, Kenosha, Wisconsin.	2C, 2CG, 2E, 2EG, 2F, 2FG, 2K, 2KG, 2P, 2PG, 7, 7A, 7AG, 7AX, 7AXG, 7B, 7BG, 7BX, 7BXG, 7G, 7X, 7XG, 9, 9G, 10BF, 10BFG, 10C, 10CG, 11C, 11CG, 12R, 12RU, 13H, 13SH, 14R, 14RG, 15R, 15RG, 16A, 16AG, 30F, 30FG, 31-15, 31-15G, 32-15, 32-15G, 33F, 33FG, 60C, 60CF, 60CFG, 60T, 60TF, 60TFG, 60TG, Davis and Thompson Modifications thereof, and Lite-N-Tite Valve Assemblies Nos. 3577, 3586, 3587, 3589, 3590, 3591, 3592, and 3593.
34	Tri-Clover Div.-Ladish Company, 2809—60th Street, Kenosha, Wisconsin.	2C, 2CG, 2CMP, 2E, 2EG, 2F, 2FG, 2FMP-14, 2FMP-15, 2K, 2KG, 2KMP, 2P, 2PG, 7, 7A, 7AG, 7AX, 7AXG, 7B, 7BG, 7BX, 7BXG, 7G, 7MP, 7X, 7XG, 9, 9G, 9MP, 10BF, 10BFG, 10BFPL, 10C, 10CG, 10CPL, 10FLP, 10MP, 10PLMP, 10TBMP, 10TL, 10TMP, 11C, 11CG, 11CPL, 11DB, 11DBMP, 11DC, 11DCMP, 11DL, 11DLMP, 11DR, 11DRMP, 11DXC, 11DXCMP, 11DXL, 11DXLMP, 11DXR, 11DXRMP, 11MP, 11PLMP, 13H, 13MS, 13SH, 14R, 14RG, 14RMP, 15R, 15RG, 16A, 16AG, 16AMP, 30F, 30FG, 31-14MP, 31-15, 31-15G, 32-14MP, 32-15, 32-15G, 33F, 33FG, 60CF, 60CFG, 60CM, 60CMG, 60CMP, 60CR, 60CRG, 60TM, 60TMG, 60TMP, 60TR, 60TRG, 60TTME, 60TTMGC, 60TTMMP, 60TTMRL, 60TTRE, 60TTRGC, 60TTRMP, 60TTRRL, 60YTME, 60YTMGC, 60YTMMP, 60YTMRL, 60YTRE, 60YTRGC, 60YTRMP, 60YTRRL, A10CD, A10CMP, B10TDF, B10TDL, B10TDMP, E60TTRE, E60TTRL, and S60TTME.
89	Universal Machining Co., Inc., 6615—28th Street, Kenosha, Wisconsin.	63-GT-1⅛ and 63-FT-1⅛.
86	Waukesha Specialty Company, Walworth, Wisconsin.	10CLR, 10F, 60TMRL, and 60YMRL.
	FITTINGS — THERMOMETER — 0901	
32	Taylor Instrument Companies, 95 Ames Street, Rochester 1, New York.	3A1 to 3A8, Inclusive.

Authorization Numbers	Concern and Address	Models Covered
	HEAT EXCHANGERS — PLATE-TYPE — 1100	
20	A. P. V. Company, Inc., 137 Arthur Street, Buffalo 7, New York.	HMB, HMBT, HX, HXC, HXL-4, and HXL-6.
46	A. P. V. (Canada) Equipment, Ltd., 56 Charles Street, Newmarket, Ontario.	HMB, HMBT, HTA, HX, HXC, HXL-4, and HXL-6.
30	Cherry-Burrell Corporation, Mill Street, Little Falls, New York.	SA, SAS, SI, SLS, EO, EOS, ESI, and EEPS.
14	Chester-Jensen Co., Inc., 5th & Tilghman Streets, Chester, Pennsylvania.	HM, HM-C, HM-F, HT, HT-C, HTF, HTFS, HTW, and HTWS.
38	Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7, Illinois.	Crescent, SC Crescent, MS Crescent, Multi-Pass, and Bantam Multi-Pass.
17	DeLaval Separator Company, Poughkeepsie, New York.	P5: EB, RC, VEB, and VRB, P13: EB, RC, VEB, and VRB, P14: RC, VEB, and VRB, P15: RC, VEB, and VRB.
15	Kusel Dairy Equipment Company, 100 W. Milwaukee Street, Watertown, Wisconsin.	"C", "DH", "ER", "ET", "J", and "S".
	HEAT EXCHANGERS — RETURN TUBULAR — 1200	
103	Chester-Jensen Company 5th & Tilghman Streets, Chester, Pennsylvania.	Ste-Vac: SV:5, 6, 8, 11, 12, 20, 30, and 40.
96	Henszey Company, 202 No. Water Street, Watertown, Wisconsin.	1-inch: 8', 16', 24', 32', 48', 60', 80', 112', and 156'; 1½-inch: 8', 16', 24', 32', 52', 76', and 96'.
	HOMOGENIZERS AND PLUNGER-TYPE PUMPS — 0400	
87	Cherry-Burrell Corporation, 2400 Sixth Street, S.W., Cedar Rapids, Iowa.	Stellar: 200, 300, 400, 500, 700, 800, 1000, 1500, 2500, 3000, and 6000. Stellar SS: 2500, 3000 and 6000. Stellar-F10: 400, 800, 1200, and 2500.
37	Creamery Package Mfg. Company, 1243 W. Washington Blvd., Chicago 7, Illinois.	Multi-F10: No. 2, No. 3, 3DD-1, 3DD-2, 3DD-3, 3DD-4, 3DD-5, and 3DD-6.
75	Manton--Gaulin Mfg. Co., Inc., 44 Garden Street, Everett 49, Mass.	DJ-3, DJ-7, M-18, M-30, M-45, and M-75.
	PUMPS — 0201 — 0202	
29	Cherry-Burrell Corporation, Mill Street, Little Falls, N. Y.	Flex-Flo: O, OH, ON, VA, VAH, VB, VBH, and VCH.
63	Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7, Ill.	2, 2F, 3, 3F, 3T, 3FT, 4, 6, 8, 9, 6SL25, and 6SL30.
65	G & H Products Corporation, 5718--52nd Street, Kenosha, Wisconsin.	135, F-135, FH-135, 136, F-136, FH-136, F-140, FH-140, F-141, F-142, GB, AB, HB, PB, CB, KB, WB, GMM, AMM, HMM, PMM, CMM, KMM, and WMM.
9	Girton Manufacturing Co., Millville, Pennsylvania.	Compensating Impeller Pump.
72	L. C. Thomsen & Sons, Inc., 1303--43rd Street, Kenosha, Wisconsin.	ODA, OSD, 1SD, 1½SD, 2SM, 3SM, 4SM, OSDU, 1SDU, 3SDU, and 4SDU.

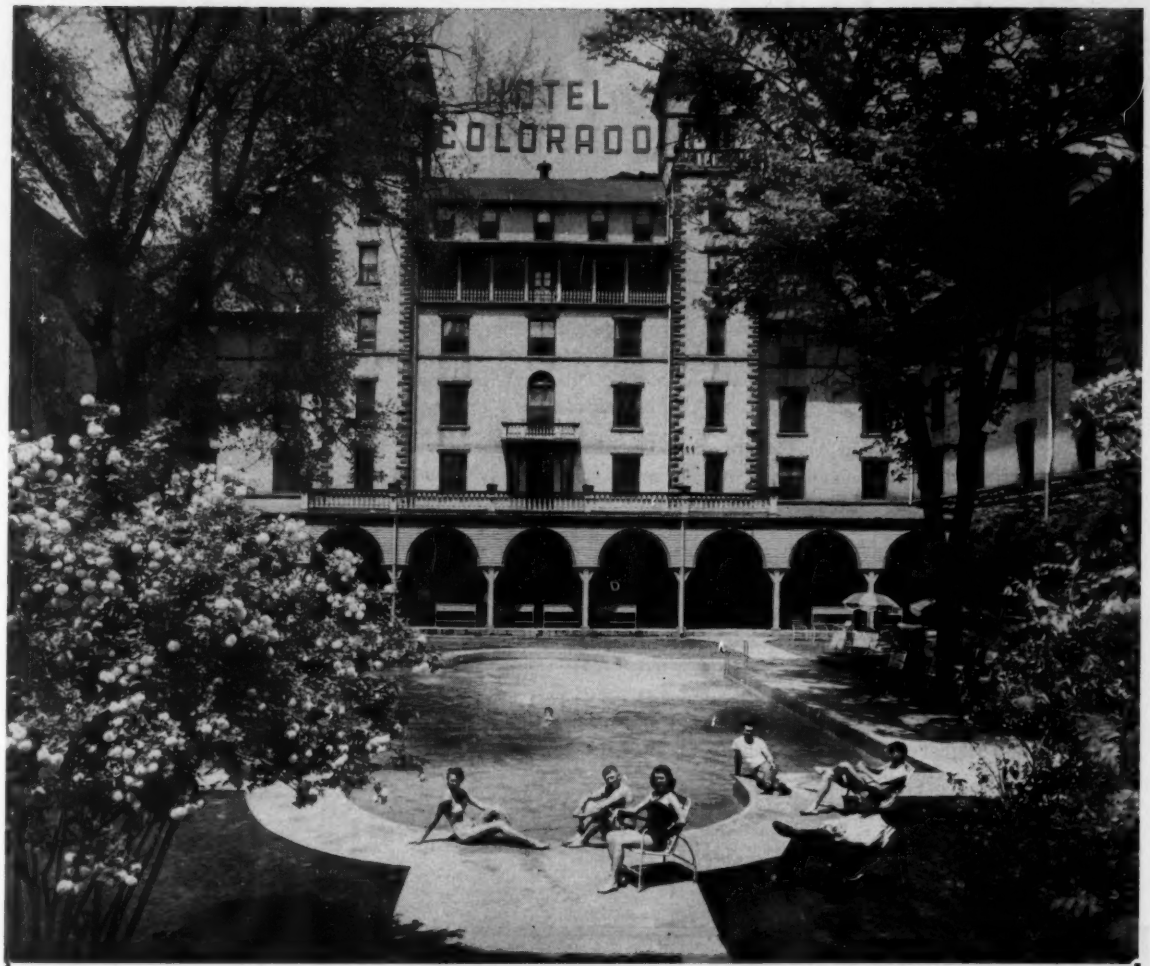
Authorization Numbers	Concern and Address	Models Covered
26	Tri-Clover Div.-Ladish Co., 2809—60th Street, Kenosha, Wisconsin.	1S, 2S, 3S, 4S, 5S, 6S, 0SS, 1SS, 2SS, 3SS, MS, S, 1½EJ, 2EJ, 2EBH, 2½EH, 3EH, and 4EH, with carbon rotary seal #105, or water-cooled rotary seal #141
52	Viking Pump Company, Cedar Falls, Iowa.	J:170 to 178, 174A, 7171A; KK: 170 to 178, 174A, 7171A; L: 170 to 177, 174A, and 7171A.
5	Waukesha Foundry Company, Waukesha, Wisconsin.	BB: 2, 10, 25, 55, 100, 125; CIP: 10, 25; Standard: 5, 10, DO: 2, 10, 25, 55, 100, 125, and 200.
	TANKS — FARM — 1300	
99	Henry C. Bergmann, Inc. 5601 E. Imperial Hwy., South Gate, California.	BC, HT, and RRB.
60	Blackburn Stainless Steel Products, 9744 Firestone Blvd., Downey, Calif.	Model numbers not employed.
19	Brown Equipment Company, Rte. No. 1, Coalville, Utah.	A: 200 to 3000; B: 100 to 1500; S: 100 to 350; SL: 200, 250; RC: 100 to 350; RSC: 100 to 350.
33	Cherry-Burrell Corporation, 2400 Sixth Street, S. W., Cedar Rapids, Iowa.	FTD-D: 90 and 150; FTD-EOD: 90 and 150; FTM-D: 120, 185, 285, and 400. FTM-EOD: 185, 285, and 400.
13	Cherry-Burrell Corporation, Mill Street, Little Falls, New York.	Kold-Vat: FTC, FTC-1, and K.
81	Clark Manufacturing, Inc., 1936 North A Street, Wellington, Kansas. Formerly Clarkson & Clark, Inc.	R: 150 to 1500; S: 150 to 400.
36	Craft Manufacturing Company, 2301 Davis Street, North Chicago, Ill.	CM: 100 to 800.
11	Creamery Package Mfg. Company, 1243 W. Washington Blvd., Chicago 7, Ill.	C: 100; CFA: 180 to 375; CFO: 180 to 500; R: 300 to 1000; RF: 375 to 600; RFB: 180 to 375; RS: 200 to 400; VA: 375.
4	Dairy Equipment Company, 1444 E. Washington Avenue, Madison, Wisconsin.	DKS: 100 to 1250.
49	DeLaval Separator Company, Poughkeepsie, N. Y.	D: 250 to 500; DA: 180 to 375; DRB: 180 to 600; DRS: 200 to 500; DV: 375; R: 800 and 1000.
92	The DeLaval Company, Ltd., 113 Park Street, So., Peterborough, Ontario.	90 to 400.
94	Esco Cabinet Company, West Chester, Pennsylvania.	BW: 150 to 1000.
10	Girton Manufacturing Company, Millville, Pennsylvania.	DeLuxe and Thrifty.
95	Globe Fabricators, Inc., 7744 Madison Street, Paramount, California.	R and RB.
22	Groen Manufacturing Company, 4535 Armitage Avenue, Chicago 39, Illinois.	RW, RW2, RW3, RWL, and RWL3: 75 to 340 gal. W and WL: 300 to 600 gal. TW: 320 to 725 gal.

Authorization Numbers	Concern and Address	Models Covered
55	Haverly Equipment Div.-John Wood Company, First Avenue, Royersford, Pennsylvania.	HB: 100 to 1000 JW: 160 to 720 HSR: 160 to 720
51	C. E. Howard Corporation, 9001 Rayo Avenue, South Gate, California.	H, K, HS, and KS.
61	Sani-Kool Div.-James Mfg. Co. 104 W. Milwaukee Avenue, Fort Atkinson, Wisconsin.	FK: 175 to 2100 FK-EOD: 500 to 1000 SK: 175 to 5000
48	Metal Products Co., Inc., 4219 Irving, Wichita, Kansas.	PR, PS, 4R, and 4S.
41	Mojonnier Bros. Co., 4601 W. Ohio Street, Chicago 44, Illinois.	D: 1000, 1200; F: 100 to 200; G: 1500; J: 250, 300; L: 500 to 800; N: 400; V: 200 to 1000.
12	Paul Mueller Company, 1616 W. Phelps Street, Springfield, Missouri.	M: 150 to 2000 gal. MC: 400 and 700 gal. MS: 150 to 400 gal. MCS: 400 gal. PS: 90 gal.
112	Nichols Refrigeration Co., Medina, Ohio.	BT: 31, 51, 52, 72, 73, 103, 104, 254, 255, 275, 2106, 2107, 2108. DBT: 3 and 4.
57	The Pfaudler Co.-A Div. of Pfaudler Permutit, Inc., 1000 West Avenue, Rochester 3, N. Y.	Lo-Vat DS: 18, 25, 34, 40, 50, Lo-Vat DSR: 25, 34, 40, 50, and 60.
58	Schweitzer's Dairy Equpiment, 806 No. Todd Avenue, Azusa, California.	BC, SH, and SW.
6	Solar Permanent Division, U. S. Industries, Inc., Tomahawk, Wisconsin.	Milkminder: 1-1000, 1-1100, 18-1000, 2-1000, 3-1000, 4-1000, 5-1000, 6-1000, 7-1000, 8-1000, and 10-1000.
8	Stainless, Inc., 15048 Delano Street, Van Nuys, California.	O, R, and U.
50	Emil Steinhorst & Sons, Inc., 612-616 South Street, Utica, New York.	E: 18, 26, 36; L: 30, 40, 50, 60, 80, 100; LN: 30, 40, 50. 60; LS: 20, 30, 40; W: 18, 26.
104	Vacooler Company, 136 Winkles Street, Elyria, Ohio.	V:200 to 1000.
18	Whirlpool Corp.-St. Paul Div., 850 Arcade Street, St. Paul 6, Minnesota.	MC-PX: 150 to 735.
42	Van Vetter, Inc., 2130 Harbor Avenue, S. W., Seattle, Washington.	AV: 200 to 1000. VVS: 125 to 1500 VVSS: 125, 250, and 300.
24	Wilson Refrigeration, Inc., Smyrna, Delaware.	WB: 100 to 700. WDE: 150 to 700.
16	Zero Sales Corporation, Washington, Missouri.	T-20.
	TANKS — STORAGE — 0101	
84	Alloy Products Corporation, 1045 Perkins Avenue, Waukesha, Wisconsin.	Model numbers not employed for unrefrigerated units. Refrigerated: BH and PR.
90	A. H. Arnold Company, 2501 No. Wayne Avenue, Chicago 14, Illinois.	Model numbers not employed.
97	Beseler Steel Products, Inc., South City Limits Road, Marshfield, Wisconsin.	ST-58.

Authorization Numbers	Concern and Address	Models Covered
54	Blackburn Stainless Steel Products, 9744 Firestone Blvd., Downey, California.	Model numbers not employed.
28	Cherry-Burrell Corporation, Mill Street, Little Falls, N. Y.	EHCW, EHP, EHS, ER, ERW, EVCW, and EVP.
102	Chester-Jensen Company, 5th & Tilghman Streets, Chester, Pennsylvania.	Purity Rect: AH-H, AH-M, and AH-L. Purity Cyl: AH-C.
1	Chicago Stainless Equipment Corp., 5001 No. Elston Avenue, Chicago 30, Ill.	Model numbers not employed.
2	Creamery Package Mfg. Co., 1243 Washington Blvd., Chicago 7, Ill.	Model numbers not employed.
76	Damrow Brothers Company, 196 Western Avenue, Fond du Lac, Wisconsin.	E, ER, O, OP, OR, P, R, RP, RR, S, SC, SP, and SR.
109	Girton Manufacturing Company, Millville, Pennsylvania.	CT: 600 to 5000.
21	The J. A. Gosselin Company, Ltd., P. O. Box 308, Drummondville, Quebec.	CH, CV, and RH.
44	The Heil Company, 3000 W. Montana, Milwaukee 1, Wisconsin.	Model numbers not employed.
83	Metal-Glass Products Co., 3333 Hammond Avenue, Elkhart, Indiana.	FL, FM, and FS.
53	The Pfaudler Co., A Division of Pfaudler Permutit, Inc., 1000 West Avenue, Rochester 3, N. Y.	Model numbers not employed.
39	Stainless & Steel Products Co., 1000 Berry Street, St. Paul 14, Minnesota.	ST-3G: 1000 to 8000 gal. ST-5G: 1500 to 7000 gal.
3	Stainless, Inc., 15048 Delano Street, Van Nuys, California.	O and R.
31	Walker Stainless Equipment Co., Elroy, Wisconsin.	HHT: 1000 to 10,000 and 1000R to 10,000R HET: 750 to 3100, and 750R to 3100R RT: 1000 to 10,000, and 600R to 6000R. VHT: 800 to 1800.
	TANKS — TRANSPORTATION AND PICK-UP — 0502	
91	A. H. Arnold Company, 2501 No. Wayne Avenue, Chicago 14, Illinois.	Model numbers not employed.
98	Beseler Steel Products, Inc., South City Limits Road, Marshfield, Wisconsin.	BPT-58
59	Blackburn Stainless Steel Products, 9744 Firestone Blvd., Downey, California.	Model numbers not employed.
70	Jacob Brenner Company, 450 Arlington Avenue, Fond du Lac, Wisconsin.	57 BMPT: 1000 to 3500 NE: 1200 to 3500 NETR: 2500 to 5000 57 STMT: 2700 to 5000 58 TL: 1600 to 2500
66	Dairy Equipment Company, 1444 E. Washington Avenue, Madison, Wisconsin.	Model numbers not employed.
43	Damrow Brothers Company, 196 Western Avenue, Fond du Lac, Wisconsin.	TF: 500 to 3500 gal. FF: 2000 to 5000 gal.

Authorization Numbers	Concern and Address	Models Covered
45	The Heil Company, 3000 W. Montana, Milwaukee 1, Wisconsin.	Model numbers not employed.
101	G. H. Hick & Sons, Inc., 3908 Cane Run Road, Louisville 1, Ky.	FTT, FTTC, FTTR, FTTRC, TT, TTC, TTR, and TTRC.
93	Pennsylvania Furnace & Iron Co., 316 Pine Street, Warren, Pennsylvania.	B: 1000 to 3200 BT: 3000 to 5500 F: 1000 to 3200 FT: 2250 to 4250
85	Polar Manufacturing Co., Holdingford, Minnesota.	BP-1500 and BP-1700.
71	Progress Manufacturing Company, Inc., 400 E. Progress Street, Arthur, Illinois.	Model numbers not employed.
80	C. Richardson & Company, Ltd., Wellington Street, So., St. Marys, Ontario.	R-S-1-2: 10, 12, 14, 15, 16, 18, 20, 24, and 30.
40	Stainless & Steel Products Co., 1000 Berry Avenue, St. Paul 14, Minnesota.	TT-3G: 500 to 3500 gal. TT-4G: 500 to 5000 gal. PUTT-3G: 1200 to 1500 gal. PUTT-4G: 2500 to 5000 gal.
7	Stainless, Inc., 15048 Delano Street, Van Nuys, California.	Standard and Light-Flight.
47	Standard Steel Works, Inc., 16th & Howell Streets, North Kansas City 16, Mo.	Model numbers not employed.
25	Walker Stainless Equipment Co., New Lisbon, Wisconsin.	BPC: 158R, 957S, 1158P BPT: 156, 1057 TT: 158, 756, TTRS: 756
	VALVES — LEAK PROTECTOR — 1400	
69	G & H Products Corporation, 5718—52nd Street, Kenosha, Wisconsin.	10F, 10FL, 10CL, and 11CL.
78	L. C. Thomsen & Sons, Inc., 1303—43rd Street, Kenosha, Wisconsin.	10CL and 10FL.
27	Tri-Clover Div.-Ladish Co., 2809—60th Street, Kenosha, Wisconsin.	10CL, 10FL, and 70L.

This list supersedes any and all lists previously published.



GREETINGS FROM HOTEL COLORADO,

Glenwood Springs Colorado!

August 25-28, 1959 are the dates scheduled for the 1959 Convention of the International Association of Milk and Food Sanitarians. A very cordial invitation is extended to you and yours to be with us at Hotel Colorado, where plans are now well formulated to make your '59 meeting one long to be remembered.

Our Management and Staff are anticipating with pleasure, having each and every member of your splendid organization at Hotel Colorado and assure our utmost cooperation in every way to make your meeting pleasant and successful.

"Our De Laval ultra-high temperature pasteurizer gives us better flavor, better shelf life"

"SINCE WE installed the unit, we have had many favorable comments on the flavor and keeping qualities of our milk and milk products," writes Mr. Ernest Adair, owner of Adair Milk Farm in Champaign, Illinois.

"The longer shelf life we get through our De Laval Ultra-High Temperature Pasteurizer enables us to stagger our operations. For example, we process creams only once a week. We never process more than two by-products on any processing day, and we process *all of our products* through this pasteurizer . . . Homo–2%–creams–chocolate milk–and ice cream mix. After processing is completed, we clean the pasteurizer in place.

"One of the most notable changes since ultra-high temperature operation is the absence of off-flavors and odors we have had to contend with because of the cows' feed. We consider this piece of equipment an excellent addition to our plant and operation."

AT A PRICE YOU CAN AFFORD: The De Laval Ultra-High Temperature Pasteurizer is a new concept in pasteurization that is readily accessible to you and every milk plant operator. Pasteurize mix at 240°F . . . milk at 195°F. It's as easy and simple as H.T.S.T. pasteurization, and *without* the previous drawback of "cooked flavor" or "flat taste." The price? Only a little more than a conventional H.T.S.T. pasteurizer! And, if you already have a De Laval H.T.S.T. Pasteurizer, it can be converted to an Ultra-High Temperature Pasteurizer at very little cost.

The De Laval Ultra-High Temperature Pasteurizer can be used with any model De Laval Plate Heat Exchanger. Thus, you can obtain ultra-high temperature pasteurizing with capacities from 2,000 to 80,000 lbs. per hour.

SOME OF THE ADVANTAGES:

- Lower Bacteria Counts
- Better Flavor and Body
- Longer Shelf Life
- Staggered Plant Operation
- No Steam in Product
- Low Cost

WANT MORE INFORMATION?
Then contact your De Laval Dealer or write to us today. No obligation, of course, in either case.

DE LAVAL

Dept. JM-7

THE DE LAVAL SEPARATOR COMPANY
Poughkeepsie, New York
5724 N. Pulaski, Chicago 46, Illinois
DE LAVAL PACIFIC COMPANY
201 E. Millbrae Avenue, Millbrae, Calif.